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VOLUME 76 NUMBER 7

UNITED STATES DEPARTMENT OF COMMERCE
Charles Sawyer, Secretary
WEATHER BUREAU
F. W. Reichelderfer, Chief

MONTHLY WEATHER REVIEW

JULY 1948

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MONTHLY WEATHER REVIEW

Editor, James E. Caskey, Jr.

VOL. 76, No. 7
W. B. No. 1529

JULY 1948

CLOSED SEPTEMBER 5, 1948
ISSUED OCTOBER 15, 1948

METEOROLOGICAL AND CLIMATOLOGICAL DATA FOR JULY 1948

AEROLOGICAL OBSERVATIONS

[For description of change in Table 1 and charts, see REVIEW, January 1946, p. 6]

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during July 1948*

STATIONS AND MEAN SURFACE PRESSURES

Standard pressure surface (mb.)	Albany, N. Y. (1,002.9 mb.)				Albuquerque, N. Mex. (837.7 mb.)				Apalachicola, Fla. (1,016.4 mb.)				Atlanta, Ga. (982.1 mb.)				Big Spring, Tex. (925.6 mb.)				Bismarck, N. Dak. (951.8 mb.)				Boise, Idaho (912.1 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	86	19.2	81	31	1,620	26.7	30	31	5	26.2	85	31	300	25.2	78	31	774	27.6	53	31	505	22.8	66	31	868	25.0	36
1,000	31	111	(*)	----	31	17	(*)	----	31	149	25.8	83	31	140	(*)	----	31	82	(*)	----	31	70	(*)	----	31	50	(*)	----
950	31	562	20.4	63	31	491	(*)	----	31	604	23.1	81	31	596	24.7	73	31	541	(*)	----	31	522	(*)	----	31	513	(*)	----
900	31	1,021	17.4	64	31	979	(*)	----	31	1,072	20.5	78	31	1,066	21.9	73	31	1,023	26.5	51	31	993	21.2	57	31	985	25.4	28
850	31	1,507	13.8	67	31	1,490	(*)	----	31	1,564	17.5	76	31	1,560	18.7	72	31	1,525	23.0	55	31	1,485	17.5	62	31	1,484	21.8	29
800	31	2,015	10.4	66	31	2,025	24.3	30	31	2,081	14.3	75	31	2,079	15.3	70	31	2,051	18.9	60	31	2,000	14.0	60	31	2,005	17.5	33
750	31	2,555	7.3	62	31	2,590	20.1	33	31	2,672	11.0	73	31	2,626	12.1	63	31	2,605	14.8	62	31	2,547	10.7	54	31	2,554	12.8	38
700	31	3,115	4.4	50	31	3,175	15.1	38	31	3,198	7.8	70	31	3,199	8.7	59	31	3,182	11.3	54	31	3,114	7.2	51	31	3,127	8.0	42
650	31	3,721	1.5	45	31	3,795	9.9	44	31	3,809	4.3	68	31	3,812	5.0	59	31	3,801	7.2	54	31	3,722	3.4	49	31	3,737	3.5	41
600	31	4,356	−2.0	43	31	4,456	4.3	51	31	4,454	.6	70	31	4,458	1.2	59	31	4,448	2.8	54	31	4,363	−.9	48	31	4,378	−.9	41
550	31	5,043	−5.8	42	31	5,155	−1.4	59	31	5,151	−3.2	70	31	5,157	−2.4	55	31	5,151	−1.8	47	31	5,056	−5.3	39	31	5,065	−5.7	40
500	31	5,784	−10.2	41	31	5,910	−7.2	65	31	5,897	−7.5	69	30	5,906	−6.4	51	31	5,902	−6.6	45	31	5,794	−10.2	34	30	5,809	−11.0	39
450	31	6,596	−15.1	42	31	6,729	−12.5	63	31	6,724	−12.2	66	30	6,730	−11.4	49	30	6,728	−11.4	44	31	6,609	−16.0	37	30	6,615	−16.3	----
400	31	7,469	−21.1	----	31	7,614	−18.0	55	31	7,603	−17.8	62	30	7,615	−17.2	44	30	7,613	−17.0	42	31	7,475	−22.4	----	29	7,483	−22.9	----
350	31	8,440	−28.3	----	31	8,599	−24.6	----	30	8,588	−24.8	----	29	8,603	−24.1	----	30	8,601	−23.7	----	31	8,441	−29.6	----	29	8,447	−30.3	----
300	31	9,526	−36.8	----	31	9,702	−32.9	----	29	9,688	−33.2	----	29	9,709	−32.6	----	30	9,709	−31.9	----	31	9,521	−38.0	----	29	9,524	−38.8	----
250	31	10,763	−45.7	----	30	10,960	−42.2	----	29	10,943	−43.1	----	29	10,966	−42.8	----	30	10,972	−41.5	----	31	10,751	−46.9	----	29	10,750	−47.8	----
200	31	12,218	−54.8	----	30	12,434	−52.8	----	28	12,405	−55.3	----	28	12,432	−54.5	----	29	12,447	−52.4	----	31	12,201	−54.4	----	28	12,198	−55.2	----
175	30	13,065	−58.9	----	30	13,284	−58.1	----	27	13,240	−61.8	----	27	13,272	−60.5	----	29	13,299	−57.9	----	31	13,052	−56.3	----	28	13,046	−56.7	----
150	27	14,021	−61.3	----	29	14,246	−63.6	----	27	14,180	−67.9	----	26	14,218	−66.2	----	27	14,265	−63.3	----	31	14,028	−56.9	----	26	14,025	−56.7	----
125	24	15,141	−62.1	----	19	15,354	−68.9	----	24	15,268	−71.5	----	26	15,312	−69.5	----	23	15,375	−68.2	----	30	15,177	−58.6	----	22	15,171	−58.2	----
100	23	16,521	−60.9	----	----	----	----	----	20	16,581	−71.9	----	18	16,641	−68.4	----	----	----	----	----	25	16,579	−58.7	----	14	16,586	−59.8	----
80	19	17,914	−59.1	----	----	----	----	----	12	17,900	−68.2	----	9	17,987	−63.5	----	----	----	----	----	16	17,987	−57.2	----	10	18,002	−58.7	----
60	15	19,719	−56.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	11	19,805	−55.2	----	----	----	----	----
50	8	20,890	−54.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
40	5	22,318	−51.8	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Standard pressure surface (mb.)	Brownsville, Tex. (1,012.2 mb.)				Buffalo, N. Y. (988.2 mb.)				Camaguey, Cuba [2] (..... mb.)				Caribou, Maine (988.6 mb.)				Charleston, S. C. (1,015.1 mb.)				Ciudad Victoria, Mexico (971.7 mb.)				Columbia, Mo. (985.6 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	6	27.5	83	31	221	20.2	77	----	----	----	----	31	191	16.2	82	31	13	24.6	92	31	335	29.6	56	31	239	24.5	79
1,000	31	113	26.8	83	31	118	(*)	----	----	----	----	----	31	93	(*)	----	31	145	25.0	88	31	77	(*)	----	31	112	(*)	----
950	31	569	23.8	83	31	565	19.8	69	----	----	----	----	31	531	17.4	65	31	598	23.6	76	31	538	27.6	57	31	565	24.1	71
900	31	1,039	21.8	70	31	1,026	16.7	72	----	----	----	----	31	991	14.3	64	31	1,069	21.1	72	31	1,013	23.5	60	31	1,035	21.3	71
850	31	1,535	19.6	59	31	1,511	13.4	69	----	----	----	----	31	1,472	10.9	66	31	1,562	17.9	73	31	1,510	19.8	64	31	1,529	18.3	67
800	31	2,055	16.9	53	31	2,015	10.4	67	----	----	----	----	31	1,975	7.7	67	31	2,079	14.7	71	31	2,030	16.2	65	31	2,047	15.5	58
750	31	2,606	13.8	49	31	2,559	8.0	59	----	----	----	----	31	2,506	4.0	68	31	2,628	11.5	69	31	2,576	12.6	62	31	2,599	12.3	55
700	31	3,181	10.4	50	31	3,122	5.1	53	----	----	----	----	31	3,062	.5	66	31	3,198	8.4	66	31	3,153	9.3	55	31	3,167	8.7	54
650	31	3,796	6.5	55	31	3,726	1.9	49	----	----	----	----	31	3,657	−2.2	53	31	3,810	4.8	67	29	3,764	5.8	52	31	3,780	4.9	51
600	31	4,446	2.5	50	31	4,366	−1.7	47	----	----	----	----	31	4,286	−5.5	47	31	4,457	1.2	67	27	4,416	2.0	51	31	4,426	1.1	49
550	31	5,148	−1.6	46	30	5,055	−5.5	36	----	----	----	----	31	4,964	−9.6	45	31	5,157	−2.5	66	27	5,116	−1.8	45	31	5,122	−2.9	45
500	31	5,898	−6.1	45	30	5,796	−9.6	----	----	----	----	----	31	5,693	−14.1	43	30	5,904	−6.7	60	27	5,867	−6.2	40	31	5,870	−7.5	41
450	31	6,724	−11.1	44	28	6,614	−14.7	----	----	----	----	----	31	6,491	−19.2	46	30	6,733	−11.7	57	27	6,694	−11.1	41	31	6,694	−12.6	41
400	31	7,611	−17.2	47	28	7,489	−20.7	----	----	----	----	----	31	7,352	−25.1	----	30	7,614	−17.4	58	27	7,579	−17.0	47	31	7,572	−18.7	41
350	31	8,598	−24.1	----	28	8,462	−27.7	----	----	----	----	----	31	8,309	−31.8	----	30	8,600	−24.4	----	27	8,566	−24.5	----	31	8,554	−25.5	----
300	31	9,704	−32.3	----	28	9,552	−35.5	----	----	----	----	----	31	9,381	−39.6	----	29	9,706	−32.7	----	27	9,671	−32.9	----	31	9,654	−33.3	----
250	30	10,962	−42.4	----	27	10,792	−44.5	----	----	----	----	----	31	10,608	−46.7	----	29	10,963	−42.8	----	26	10,929	−43.0	----	30	10,911	−42.5	----
200	30	12,432	−54.1	----	26	12,253	−53.3	----	----	----	----	----	28	12,074	−52.2	----	29	12,429	−54.5	----	22	12,399	−54.2	----	27	12,382	−53.3	----
175	27	13,273	−60.3	----	24	13,105	−56.9	----	----	----	----	----	27	12,930	−53.4	----	29	13,271	−60.5	----	9	13,253	−61.0	----	21	13,242	−58.3	----
150	25	14,220	−66.1	----	20	14,090	−59.8	----	----	----	----	----	18	13,908	−53.4	----	29	14,218	−65.9	----	----	----	----	----	18	14,198	−63.7	----
125	22	15,317	−70.2	----	11	15,200	−61.0	----	----	----	----	----	----	----	----	----	25	15,311	−69.5	----	----	----	----	----	11	15,313	−68.4	----
100	12	16,623	−72.0	----	----	----	----	----	----	----	----	----	----	----	----	----	20	16,647	−68.9	----	----	----	----	----	8	16,650	−67.2	----
80	7	17,947	−69.0	----	----	----	----	----	----	----	----	----	----	----	----	----	8	18,007	−66.1	----	----	----	----	----	6	18,015	−63.3	----
60	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	6	19,768	−60.9	----	----	----	----	----	5	19,802	−59.0	----

See footnotes at end of table.

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during July 1948*

Standard pressure surface (mb.)	Dodge City, Kans. (923.3 mb.)				El Paso, Tex. (879.6 mb.)				Ely, Nev. (808.1 mb.)				Fort Worth, Tex. (988.4 mb.)				Glasgow, Mont. (935.8 mb.)				Grand Junction, Colo. (850.9 mb.)				Great Falls, Mont. (885.9 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	792	24.7	66	31	1,195	29.0	35	31	1,908	23.3	22	31	211	29.1	61	31	648	23.0	52	31	1,474	26.1	30	31	1,128	19.4	52
1,000	31	82	(*)	----	31	34	(*)	----	31	−2	(*)	----	31	106	(*)	----	31	62	(*)	----	31	22	(*)	----	31	69	(*)	----
950	31	541	(*)	----	31	509	(*)	----	31	470	(*)	----	31	569	28.1	56	31	519	(*)	----	31	496	(*)	----	31	523	(*)	----
900	31	1,017	25.0	59	31	997	(*)	----	31	955	(*)	----	31	1,043	24.7	59	31	988	22.1	44	31	980	(*)	----	31	995	(*)	----
850	31	1,517	22.3	56	31	1,499	27.1	34	31	1,460	(*)	----	31	1,542	20.9	62	31	1,481	18.5	46	31	1,483	(*)	----	31	1,484	18.2	44
800	31	2,042	19.3	54	31	2,032	23.3	36	31	1,996	24.8	----	31	2,063	17.2	61	31	1,997	14.5	49	31	2,016	24.2	26	31	2,000	14.4	46
750	31	2,598	15.8	52	31	2,594	18.7	42	31	2,557	20.2	----	31	2,615	13.8	54	31	2,542	10.3	53	31	2,577	19.5	28	31	2,542	10.2	50
700	31	3,176	11.7	51	31	3,176	13.7	48	31	3,144	14.9	23	31	3,190	10.1	52	31	3,109	6.1	54	31	3,164	14.3	33	31	3,111	5.8	56
650	31	3,796	7.3	45	31	3,794	8.4	54	31	3,767	9.2	29	31	3,806	6.1	54	31	3,713	1.9	54	31	3,784	8.8	40	31	3,715	1.3	58
600	31	4,445	2.6	44	31	4,451	3.2	59	31	4,421	3.3	36	31	4,454	2.3	51	31	4,353	−2.0	50	31	4,439	3.1	48	30	4,350	−2.9	58
550	31	5,144	−2.7	44	29	5,149	−1.9	60	31	5,117	−2.9	45	31	5,157	−1.9	48	31	5,042	−6.5	49	31	5,134	−2.7	55	30	5,034	−7.3	49
500	31	5,892	−7.5	39	29	5,900	−7.1	65	31	5,866	−8.3	45	31	5,904	−6.5	48	31	5,777	−11.6	47	31	5,885	−8.3	53	30	5,770	−12.2	48
450	31	6,713	−12.6	38	28	6,728	−12.3	57	30	6,683	−14.2	----	31	6,731	−11.3	43	30	6,586	−16.7	50	30	6,701	−13.7	45	30	6,570	−17.8	48
400	31	7,594	−18.5	----	28	7,607	−17.5	----	30	7,560	−20.4	----	31	7,616	−16.9	43	29	7,452	−23.4	----	30	7,580	−19.8	----	30	7,439	−24.0	----
350	31	8,576	−25.5	----	28	8,593	−24.5	----	29	8,534	−27.3	----	31	8,602	−24.5	----	27	8,411	−30.6	----	30	8,557	−26.9	----	30	8,398	−31.4	----
300	31	9,674	−33.8	----	28	9,696	−33.0	----	29	9,625	−35.4	----	31	9,704	−33.3	----	26	9,486	−38.7	----	30	9,649	−35.3	----	30	9,471	−39.6	----
250	31	10,926	−43.4	----	26	10,951	−43.1	----	29	10,870	−44.7	----	31	10,958	−43.3	----	25	10,715	−48.1	----	30	10,894	−44.4	----	29	10,693	−48.6	----
200	31	12,393	−53.8	----	25	12,416	−54.6	----	29	12,332	−53.6	----	30	12,420	−54.9	----	23	12,163	−54.4	----	29	12,356	−53.8	----	27	12,141	−54.7	----
175	30	13,240	−59.0	----	23	13,261	−61.1	----	25	13,186	−57.8	----	29	13,264	−60.9	----	22	13,014	−54.9	----	24	13,197	−58.0	----	27	12,993	−55.1	----
150	29	14,194	−63.9	----	21	14,198	−67.5	----	23	14,148	−61.5	----	28	14,210	−66.3	----	21	13,998	−55.2	----	23	14,158	−62.1	----	25	13,981	−54.9	----
125	26	15,301	−68.6	----	13	15,287	−72.0	----	20	15,257	−64.2	----	24	15,305	−70.9	----	13	15,158	−55.7	----	21	15,275	−65.7	----	20	15,144	−56.8	----
100	19	16,636	−68.0	----	6	16,570	−71.4	----	17	16,609	−65.1	----	17	16,628	−70.9	----	13	16,574	−56.3	----	12	16,621	−66.1	----	13	16,564	−56.6	----
80	17	17,986	−63.8	----	----	----	----	----	15	17,984	−60.8	----	14	17,966	−66.6	----	9	18,004	−55.1	----	5	18,012	−61.7	----	6	17,991	−56.5	----
60	12	19,778	−59.2	----	----	----	----	----	8	19,797	−57.0	----	11	19,742	−60.3	----	----	----	----	----	----	----	----	----	----	----	----	----
50	6	20,920	−56.9	----	----	----	----	----	----	----	----	----	10	20,896	−57.4	----	----	----	----	----	----	----	----	----	----	----	----	----

Standard pressure surface (mb.)	Greensboro, N. C. (985.1 mb.)				Hatteras, N. C. (1,016.3 mb.)				Havana, Cuba [1] (---- mb.)				Honolulu, T. H. (1,015.3 mb.)				Huntington, W. Va. (995.2 mb.)				International Falls, Minn. (971.3 mb.)				Joliet, Ill. (993.1 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	273	23.4	80	31	3	25.6	84	----	----	----	----	31	3	28.0	60	31	172	22.0	85	31	360	18.1	79	31	178	21.5	76
1,000	31	141	(*)	----	31	145	25.0	81	----	----	----	----	31	137	25.3	62	31	130	(*)	----	31	107	(*)	----	31	117	(*)	----
950	31	594	23.3	71	31	600	22.6	77	----	----	----	----	31	591	21.3	71	31	581	22.1	76	31	555	20.1	67	31	567	21.9	68
900	31	1,062	20.7	71	31	1,065	20.0	71	----	----	----	----	31	1,053	17.9	76	31	1,046	19.6	74	31	1,017	17.4	66	31	1,033	19.3	67
850	31	1,555	17.3	74	31	1,556	17.1	69	----	----	----	----	31	1,541	14.9	77	31	1,537	16.3	75	31	1,503	14.2	67	31	1,523	16.1	65
800	31	2,071	14.0	72	31	2,072	14.3	63	----	----	----	----	31	2,053	13.1	61	31	2,051	13.3	69	31	2,013	11.0	63	31	2,037	13.3	63
750	30	2,616	11.1	63	31	2,619	11.4	59	----	----	----	----	31	2,601	11.1	43	31	2,597	10.6	59	31	2,555	8.2	53	31	2,580	10.8	52
700	30	3,187	8.0	62	31	3,188	8.2	56	----	----	----	----	31	3,168	9.1	27	31	3,165	7.5	59	31	3,116	5.0	51	31	3,150	7.5	52
650	30	3,799	4.7	56	31	3,800	5.1	52	----	----	----	----	31	3,786	6.0	----	31	3,772	4.1	56	31	3,722	1.4	53	31	3,755	3.9	48
600	30	4,444	1.2	53	31	4,446	1.3	51	----	----	----	----	31	4,429	2.6	----	31	4,418	.3	52	31	4,358	−2.3	50	31	4,403	.0	46
550	30	5,140	−2.9	51	30	5,145	−2.6	47	----	----	----	----	31	5,130	−1.3	----	31	5,112	−3.4	50	31	5,048	−6.5	47	31	5,095	−4.1	42
500	30	5,888	−7.1	45	30	5,892	−6.9	48	----	----	----	----	31	5,881	−6.1	----	31	5,860	−7.8	49	31	5,782	−11.1	40	30	5,837	−8.8	41
450	28	6,710	−12.2	43	30	6,717	−11.8	48	----	----	----	----	31	6,708	−11.0	----	30	6,683	−12.9	----	31	6,591	−16.4	----	30	6,654	−13.8	----
400	28	7,595	−18.0	47	30	7,600	−17.8	44	----	----	----	----	31	7,593	−17.4	----	30	7,563	−18.4	----	31	7,459	−23.0	----	30	7,532	−19.7	----
350	28	8,580	−24.6	46	30	8,584	−24.6	----	----	----	----	----	31	8,579	−24.7	----	29	8,545	−25.4	----	31	8,422	−30.3	----	30	8,510	−26.7	----
300	28	9,684	−32.5	----	30	9,688	−32.8	----	----	----	----	----	31	9,680	−33.3	----	28	9,644	−33.7	----	30	9,493	−38.7	----	29	9,605	−34.5	----
250	28	10,943	−42.4	----	30	10,942	−42.8	----	----	----	----	----	31	10,935	−43.3	----	28	10,897	−43.1	----	29	10,722	−47.3	----	27	10,852	−43.5	----
200	27	12,411	−53.9	----	29	12,409	−54.3	----	----	----	----	----	31	12,401	−54.1	----	28	12,366	−53.6	----	29	12,175	−53.6	----	23	12,325	−53.0	----
175	27	13,255	−59.6	----	28	13,255	−60.2	----	----	----	----	----	31	13,245	−59.7	----	28	13,214	−58.6	----	29	13,030	−54.5	----	22	13,177	−57.1	----
150	26	14,206	−64.4	----	25	14,204	−64.8	----	----	----	----	----	31	14,196	−64.9	----	23	14,172	−62.7	----	28	14,018	−54.9	----	18	14,153	−61.0	----
125	16	15,323	−67.5	----	19	15,306	−67.4	----	----	----	----	----	31	15,295	−69.2	----	13	15,294	−65.9	----	25	15,178	−55.9	----	5	15,287	−62.1	----
100	----	----	----	----	8	16,668	−64.8	----	----	----	----	----	30	16,623	−69.6	----	9	16,633	−65.3	----	18	16,605	−56.3	----	----	----	----	----
80	----	----	----	----	6	18,041	−62.4	----	----	----	----	----	30	17,962	−66.0	----	----	----	----	----	10	18,010	−54.6	----	----	----	----	----
60	----	----	----	----	----	----	----	----	----	----	----	----	28	19,734	−59.1	----	----	----	----	----	----	----	----	----	----	----	----	----
50	----	----	----	----	----	----	----	----	----	----	----	----	26	20,889	−55.7	----	----	----	----	----	----	----	----	----	----	----	----	----
40	----	----	----	----	----	----	----	----	----	----	----	----	18	22,302	−53.1	----	----	----	----	----	----	----	----	----	----	----	----	----

Standard pressure surface (mb.)	Lake Charles, La. (1,014.5 mb.)				Lander, Wyo. (828.5 mb.)				Las Vegas, Nev. (940.7 mb.)				Little Rock, Ark. (1,004.9 mb.)				Mazatlan, Mexico (1,007.0 mb.)				Medford, Oreg. (966.8 mb.)				Merida, Mexico (1,011.4 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	5	26.3	84	31	1,696	21.9	34	31	574	35.2	14	31	79	25.5	79	31	14	29.3	73	31	401	24.6	43	30	27	26.4	81
1,000	31	132	26.8	80	31	22	(*)	----	31	11	(*)	----	31	122	25.8	77	31	77	28.7	74	31	103	(*)	----	30	128	25.7	81
950	31	588	24.3	74	31	493	(*)	----	31	489	(*)	----	31	582	26.1	65	31	536	24.6	75	31	555	23.2	43	30	579	23.9	76
900	31	1,058	21.7	69	31	972	(*)	----	31	974	33.2	----	31	1,051	23.0	70	31	1,006	22.2	75	31	1,022	19.3	47	30	1,053	21.1	75
850	31	1,552	18.9	65	31	1,471	(*)	----	31	1,485	28.7	----	31	1,548	19.7	68	31	1,502	19.5	74	31	1,510	15.2	54	30	1,545	18.0	74
800	31	2,071	16.0	60	31	2,000	21.8	28	31	2,018	23.8	----	31	2,068	16.6	66	31	2,023	16.8	69	31	2,021	11.3	59	30	2,062	14.8	70
750	31	2,617	12.8	60	31	2,557	17.3	31	31	2,581	18.7	21	31	2,618	13.3	59	31	2,583	13.7	67	31	2,564	8.1	57	30	2,609	11.7	64
700	31	3,195	9.3	58	31	3,138	12.3	36	31	3,162	13.4	24	31	3,193	10.0	55	31	3,150	10.3	68	31	3,123	5.0	45	30	3,182	8.5	60
650	31	3,808	5.6	61	31	3,754	7.2	41	31	3,781	8.0	28	31	3,810	6.2	54	31	3,770	6.3	72	31	3,727	1.6	37	29	3,794	4.9	63
600	31	4,457	1.4	63	31	4,406	1.9	45	31	4,433	3.3	28	31	4,458	2.3	54	30	4,416	2.1	74	31	4,364	−2.2	37	29	4,440	1.0	68
550	31	5,153	−2.8	61	31	5,100	−4.0	48	31	5,134	−1.5	----	31	5,157	−1.4	48	30	5,116	−2.3	75	31	5,051	−6.6	31	29	5,134	−2.9	65
500	31	5,903	−7.1	58	31	5,845	−9.4	44	31	5,884	−6.5	----	31	5,911	−5.8	49	30	5,868	−6.4	73	30	5,788	−11.9	33	28	5,886	−7.1	60
450	29	6,726	−11.7	52	31	6,663	−15.0	40	31	6,707	−12.2	----	31	6,736	−10.8	49	28	6,693	−11.1	65	30	6,595	−17.4	----	28	6,708	−12.0	55
400	29	7,611	−17.5	54	31	7,532	−21.5	----	31	7,589	−18.8	----	31	7,626	−16.6	52	28	7,582	−16.6	66	30	7,456	−24.0	----	27	7,592	−17.6	46
350	29	8,597	−24.3	----	31	8,501	−29.0	----	31	8,570	−26.0	----	31	8,615	−23.5	----	28	8,572	−23.6	----	30	8,415	−31.3	----	26	8,574	−25.0	----
300	29	9,702	−32.5	----	31	9,585	−37.2	----	31	9,667	−34.4	----	31	9,723	−31.6	----	28	9,680	−32.0	----	30	9,487	−39.6	----	25	9,674	−33.7	----
250	29	10,960	−42.8	----	30	10,820	−46.5	----	31	10,915	−44.1	----	31	10,988	−41.3	----	25	10,937	−42.2	----	30	10,711	−48.1	----	25	10,926	−44.1	----
200	28	12,426	−54.9	----	27	12,266	−55.3	----	29	12,381	−53.3	----	31	12,465	−53.0	----	15	12,410	−53.9	----	28	12,159	−54.0	----	9	12,367	−56.6	----
175	26	13,268	−61.3	----	23	13,116	−58.3	----	25	13,232	−58.6	----	31	13,312	−59.2	----	----	----	----	----	28	13,012	−55.8	----	----	----	----	----
150	26	14,210	−67.1	----	12	14,076	−59.9	----	16	14,193	−63.4	----	30	14,263	−64.5	----	----	----	----	----	28	13,990	−56.9	----	----	----	----	----
125	22	15,305	−71.6	----	----	----	----	----	----	----	----	----	20	15,365	−68.6	----	----	----	----	----	27	15,135	−58.4	----	----	----	----	----
100	11	16,637	−72.9	----	----	----	----	----	----	----	----	----	8	16,692	−71.2	----	----	----	----	----	23	16,538	−59.1	----	----	----	----	----
80	5	17,962	−69.3	----	----	----	----	----	----	----	----	----	7	18,029	−66.8	----	----	----	----	----	18	17,935	−58.0	----	----	----	----	----
60	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	12	19,760	−56.5	----	----	----	----	----

See footnotes at end of table.

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during July 1948*

Standard pressure surface (mb.)	Miami, Fla. (1,017.5 mb.)				Nantucket, Mass. (1,012.7 mb.)				Nashville, Tenn. (994.2 mb.)				New Orleans, La. (1,015.1 mb.)				North Platte, Nebr. (915.9 mb.)				Oakland, Calif. (1,012.4 mb.)				Ogden, Utah (861.6 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	4	26.3	84	31	14	17.7	93	29	180	25.7	71	31	2	25.8	86	31	849	23.0	68	31	6	16.6	74	31	1,355	25.3	33
1,000	31	157	26.1	80	31	122	19.2	84	29	129	(*)	----	31	134	26.1	81	31	71	(*)	----	31	110	15.5	76	31	18	(*)	----
950	31	609	23.2	82	31	570	19.7	66	29	585	24.3	69	31	591	24.5	72	31	529	(*)	----	31	557	16.9	64	31	490	(*)	----
900	31	1,060	20.4	80	31	1,030	17.6	57	29	1,052	21.2	71	31	1,061	21.7	68	31	1,002	24.4	58	31	1,011	20.1	37	31	974	(*)	----
850	31	1,573	17.6	76	31	1,516	14.8	55	29	1,545	18.1	68	31	1,555	18.6	64	31	1,502	21.4	55	31	1,502	18.5	26	31	1,474	26.0	26
800	31	2,089	14.6	71	31	2,027	11.8	53	29	2,063	15.3	63	31	2,074	15.5	58	31	2,025	17.9	56	31	2,019	16.1	20	31	2,004	22.4	23
750	31	2,635	11.5	66	31	2,569	9.0	46	29	2,610	11.9	61	31	2,628	12.3	57	31	2,576	14.1	54	31	2,571	13.0	19	31	2,563	17.8	24
700	31	3,207	8.0	64	31	3,133	5.9	41	29	3,182	8.7	57	31	3,195	8.8	58	31	3,153	10.2	49	31	3,140	9.6	22	31	3,144	12.7	27
650	31	3,821	4.5	65	31	3,734	2.8	36	29	3,794	5.1	53	31	3,809	5.1	59	31	3,766	6.0	43	30	3,756	6.3	----	31	3,760	7.4	32
600	31	4,464	.7	68	31	4,380	−.4	39	29	4,441	1.3	47	31	4,455	1.3	57	31	4,416	1.4	38	30	4,403	2.2	----	31	4,413	2.1	36
550	31	5,160	−3.2	68	31	5,066	−4.2	38	29	5,138	−2.6	43	29	5,155	−2.5	56	31	5,109	−3.5	39	30	5,102	−2.4	----	31	5,106	−3.7	42
500	31	5,907	−7.6	64	31	5,816	−8.5	----	28	5,887	−7.1	44	29	5,904	−6.7	53	31	5,856	−8.8	42	30	5,849	−7.6	----	31	5,853	−9.8	45
450	31	6,728	−12.4	63	31	6,632	−13.6	----	27	6,714	−11.9	----	29	6,730	−11.7	53	31	6,673	−14.4	42	30	6,668	−13.3	----	31	6,665	−15.5	----
400	30	7,611	−18.2	62	30	7,510	−19.6	----	27	7,596	−17.8	----	28	7,612	−17.4	53	31	7,547	−20.6	----	30	7,546	−19.8	----	31	7,538	−21.4	----
350	30	8,594	−25.1	----	30	8,488	−26.3	----	27	8,570	−24.6	----	28	8,599	−24.2	----	31	8,523	−27.4	----	30	8,522	−27.2	----	29	8,505	−28.7	----
300	30	9,695	−33.4	----	30	9,583	−34.6	----	26	9,684	−32.8	----	28	9,704	−32.4	----	31	9,613	−35.5	----	30	9,614	−35.3	----	29	9,590	−36.9	----
250	30	10,948	−43.6	----	30	10,832	−43.9	----	26	10,942	−42.4	----	28	10,964	−42.5	----	31	10,856	−44.8	----	30	10,861	−43.8	----	29	10,826	−46.4	----
200	30	12,408	−55.7	----	29	12,291	−53.9	----	24	12,416	−54.0	----	27	12,435	−54.7	----	29	12,314	−54.6	----	30	12,330	−52.7	----	29	12,278	−55.1	----
175	30	13,244	−62.0	----	25	13,138	−58.5	----	21	13,254	−59.8	----	26	13,275	−61.1	----	28	13,160	−58.6	----	30	13,183	−57.2	----	29	13,123	−58.5	----
150	26	14,190	−67.5	----	22	14,094	−61.6	----	13	14,210	−64.3	----	23	14,222	−66.5	----	28	14,120	−62.0	----	30	14,148	−60.9	----	28	14,091	−60.8	----
125	18	15,282	−70.2	----	21	15,221	−62.6	----	6	15,331	−68.0	----	14	15,318	−70.8	----	24	15,242	−65.2	----	26	15,269	−63.8	----	22	15,206	−63.1	----
100	8	16,614	−69.9	----	20	16,603	−61.3	----	----	----	----	----	7	16,643	−70.7	----	17	16,603	−65.3	----	12	16,612	−63.7	----	12	16,570	−63.5	----
80	----	----	----	----	14	17,990	−57.8	----	----	----	----	----	5	17,976	−67.4	----	9	17,963	−61.9	----	----	----	----	----	----	----	----	----

Standard pressure surface (mb.)	Oklahoma City, Okla. (967.6 mb.)				Omaha, Nebr. (976.8 mb.)				Phoenix, Ariz. (967.3 mb.)				Pittsburgh, Pa. (971.0 mb.)				Portland, Maine (1,010.2 mb.)				Rapid City, S. Dak. (901.5 mb.)				St. Cloud, Minn. (974.5 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	391	26.2	76	31	308	25.9	67	31	339	35.9	25	30	382	21.6	76	31	20	18.2	80	31	980	19.6	71	31	317	20.9	74
1,000	31	98	(*)	----	31	100	(*)	----	31	35	(*)	----	30	123	(*)	----	31	107	20.0	73	31	70	(*)	----	31	92	(*)	----
950	31	556	26.8	68	31	557	24.6	60	31	506	35.6	24	30	575	21.0	73	31	554	19.6	63	31	529	(*)	----	31	544	22.3	62
900	31	1,032	24.6	65	31	1,026	21.5	62	31	992	31.7	26	30	1,039	18.5	72	31	1,015	16.5	66	31	995	(*)	----	31	1,008	19.9	61
850	31	1,531	21.5	64	31	1,519	18.1	63	31	1,501	27.5	28	30	1,527	15.0	73	31	1,499	13.1	70	31	1,491	20.9	49	31	1,499	16.3	65
800	31	2,055	18.2	60	31	2,037	15.6	54	31	2,033	23.0	31	30	2,038	12.0	69	31	2,006	9.6	68	31	2,013	17.4	50	31	2,012	12.9	64
750	31	2,606	14.7	59	31	2,588	12.5	48	31	2,595	18.4	36	30	2,584	9.1	62	31	2,543	6.4	62	31	2,568	14.0	48	31	2,554	9.8	53
700	31	3,186	11.1	55	31	3,158	8.9	47	31	3,176	13.6	40	30	3,146	6.5	53	31	3,103	3.5	55	31	3,139	10.1	47	31	3,122	6.7	45
650	31	3,802	7.1	55	31	3,771	4.8	46	31	3,796	8.7	44	29	3,751	3.3	46	31	3,701	.2	51	31	3,753	5.8	47	31	3,728	3.3	40
600	31	4,454	2.8	52	31	4,416	.8	39	30	4,450	3.7	44	29	4,394	−.3	46	31	4,339	−3.2	50	31	4,401	1.1	47	31	4,372	−.6	37
550	31	5,155	−1.9	47	30	5,112	−3.4	35	30	5,154	−1.2	45	29	5,088	−4.2	----	31	5,025	−6.6	45	31	5,094	−3.8	46	31	5,062	−4.8	36
500	31	5,905	−6.3	42	30	5,857	−8.4	----	29	5,905	−6.2	44	28	5,831	−8.3	----	31	5,763	−10.9	46	31	5,840	−9.3	48	30	5,808	−9.2	----
450	30	6,732	−11.1	38	30	6,677	−13.9	----	28	6,735	−11.1	----	28	6,653	−13.3	----	31	6,569	−16.0	47	31	6,654	−15.0	49	29	6,624	−15.1	----
400	29	7,617	−16.9	37	30	7,552	−20.2	----	28	7,618	−16.9	----	28	7,529	−19.1	----	31	7,444	−21.9	----	31	7,527	−21.1	----	29	7,501	−21.5	----
350	28	8,605	−24.0	----	30	8,527	−27.5	----	28	8,605	−24.6	----	28	8,509	−25.8	----	30	8,418	−28.4	----	31	8,500	−28.0	----	29	8,469	−29.1	----
300	26	9,708	−32.4	----	30	9,616	−35.9	----	28	9,708	−33.2	----	27	9,607	−33.9	----	30	9,504	−36.5	----	31	9,589	−36.2	----	29	9,553	−37.4	----
250	26	10,969	−41.8	----	30	10,859	−45.1	----	26	10,961	−43.1	----	27	10,859	−43.5	----	30	10,744	−45.6	----	31	10,830	−45.4	----	29	10,788	−46.0	----
200	26	12,444	−52.7	----	30	12,318	−54.2	----	25	12,429	−53.8	----	27	12,325	−53.6	----	30	12,201	−54.4	----	29	12,288	−53.8	----	25	12,245	−52.9	----
175	26	13,294	−58.2	----	29	13,167	−57.9	----	20	13,278	−59.6	----	27	13,173	−58.5	----	29	13,051	−57.7	----	29	13,138	−57.0	----	19	13,080	−55.2	----
150	25	14,251	−63.7	----	28	14,130	−62.0	----	8	14,240	−65.6	----	27	14,134	−62.1	----	28	14,012	−60.2	----	25	14,103	−58.6	----	11	14,025	−54.6	----
125	13	15,353	−68.8	----	27	15,248	−65.4	----	----	----	----	----	23	15,245	−64.5	----	26	15,144	−60.4	----	19	15,234	−59.9	----	----	----	----	----
100	6	16,683	−68.4	----	25	16,600	−64.3	----	----	----	----	----	16	16,602	−63.8	----	23	16,537	−59.7	----	17	16,627	−60.9	----	----	----	----	----
80	----	----	----	----	21	17,975	−61.3	----	----	----	----	----	13	17,977	−60.9	----	16	17,934	−58.2	----	12	18,015	−58.1	----	----	----	----	----
60	----	----	----	----	15	19,769	−57.1	----	----	----	----	----	7	19,782	−57.7	----	11	19,757	−54.8	----	7	19,843	−55.0	----	----	----	----	----
50	----	----	----	----	9	20,929	−55.2	----	----	----	----	----	----	----	----	----	8	20,920	−53.1	----	----	----	----	----	----	----	----	----
40	----	----	----	----	6	22,370	−51.1	----	----	----	----	----	----	----	----	----	7	22,359	−51.9	----	----	----	----	----	----	----	----	----
30	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	5	24,213	−50.5	----	----	----	----	----	----	----	----	----

Standard pressure surface (mb.)	San Antonio, Tex. (984.6 mb.)				San Juan, P. R. (1,015.4 mb.)				Santa Maria, Calif. (1,004.7 mb.)				Sault Ste. Marie, Mich. (987.2 mb.)				Spokane, Wash. (930.3 mb.)				Swan Island, W. I. (1,013.1 mb.)				Tacubaya, Mexico (774.4 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	240	28.7	66	31	15	26.6	83	31	71	15.7	77	31	221	15.7	83	31	721	22.0	42	31	9	26.8	85	31	2,306	16.3	77
1,000	31	102	(*)	----	31	151	25.7	83	31	111	15.0	78	31	109	(*)	----	31	88	(*)	----	31	125	26.4	85	31	65	(*)	----
950	31	564	26.7	67	31	603	22.4	84	31	552	15.3	72	31	555	17.2	66	31	539	(*)	----	31	581	23.0	85	31	529	(*)	----
900	31	1,036	23.5	70	31	1,071	19.4	83	31	1,008	20.9	34	31	1,010	15.5	59	31	1,007	19.6	43	31	1,047	20.2	81	31	1,005	(*)	----
850	31	1,534	20.0	72	31	1,562	16.6	78	31	1,502	20.4	24	31	1,493	12.8	62	31	1,496	15.4	47	21	1,540	17.4	75	31	1,500	(*)	----
800	31	2,054	16.5	71	31	2,077	14.5	62	31	2,022	17.4	26	31	2,000	9.8	63	31	2,006	10.9	54	31	2,056	14.7	67	31	2,024	(*)	----
750	31	2,606	13.8	60	31	2,623	11.9	50	31	2,577	14.4	----	31	2,540	7.5	52	31	2,543	6.4	59	31	2,608	11.9	59	31	2,575	14.3	78
700	31	3,182	10.9	52	31	3,196	8.4	48	31	3,148	11.5	----	31	3,100	4.6	47	31	3,103	2.6	54	31	3,175	8.5	57	31	3,157	10.2	82
650	31	3,797	7.0	52	31	3,808	4.6	48	31	3,765	7.7	----	30	3,700	1.1	42	31	3,698	−1.0	49	31	3,788	4.8	56	31	3,773	5.9	86
600	31	4,449	2.8	55	31	4,452	.7	44	31	4,416	3.3	----	30	4,337	−2.7	38	31	4,332	−5.0	47	31	4,433	.9	59	31	4,423	1.5	88
550	31	5,153	−1.5	54	31	5,149	−3.1	41	31	5,116	−1.3	----	30	5,023	−6.8	36	31	5,012	−9.3	45	30	5,128	−3.1	54	31	5,122	−2.5	84
500	31	5,902	−5.8	49	30	5,896	−7.2	45	31	5,867	−6.1	----	30	5,760	−11.4	33	31	5,742	−13.9	42	29	5,877	−7.3	48	31	5,872	−6.8	78
450	31	6,731	−11.0	43	30	6,718	−12.8	45	31	6,687	−11.8	----	30	6,565	−16.7	----	31	6,540	−19.5	47	28	6,700	−12.0	47	30	6,696	−11.5	74
400	31	7,616	−16.9	43	30	7,599	−18.9	51	31	7,574	−18.3	----	30	7,436	−22.9	----	31	7,398	−25.8	----	28	7,585	−17.5	50	30	7,582	−17.0	67
350	30	8,604	−23.7	----	30	8,579	−26.0	----	31	8,556	−25.7	----	30	8,402	−29.8	----	31	8,351	−33.0	----	27	8,571	−24.8	----	30	8,569	−24.3	----
300	29	9,713	−31.8	----	30	9,676	−34.3	----	31	9,654	−34.0	----	30	9,482	−37.6	----	31	9,417	−40.8	----	27	9,672	−33.1	----	30	9,674	−32.7	----
250	29	10,976	−41.5	----	30	10,926	−44.3	----	30	10,904	−43.3	----	29	10,712	−45.6	----	30	10,633	−48.8	----	26	10,925	−43.4	----	27	10,932	−42.9	----
200	29	12,452	−53.0	----	30	12,381	−56.4	----	27	12,370	−53.1	----	27	12,176	−52.3	----	29	12,076	−52.3	----	26	12,386	−55.6	----	20	12,389	−56.3	----
175	29	13,301	−59.0	----	30	13,217	−62.5	----	25	13,219	−57.8	----	21	13,024	−54.4	----	28	12,935	−52.1	----	26	13,223	−62.5	----	17	13,231	−63.4	----
150	26	14,251	−64.4	----	29	14,154	−68.2	----	25	14,178	−62.9	----	10	14,025	−54.3	----	28	13,931	−52.6	----	23	14,163	−69.5	----	11	14,153	−70.6	----
125	15	15,357	−68.9	----	22	15,248	−69.8	----	24	15,292	−66.9	----	----	----	----	----	28	15,106	−53.4	----	6	15,267	−72.2	----	----	----	----	----
100	----	----	----	----	11	16,564	−71.9	----	17	16,624	−67.1	----	----	----	----	----	26	16,537	−54.4	----	----	----	----	----	----	----	----	----
80	----	----	----	----	5	17,878	−69.3	----	7	17,961	−62.1	----	----	----	----	----	23	17,965	−54.5	----	----	----	----	----	----	----	----	----
60	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	18	19,808	−53.0	----	----	----	----	----	----	----	----	----
50	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	16	20,970	−51.8	----	----	----	----	----	----	----	----	----
40	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	6	22,460	−48.9	----	----	----	----	----	----	----	----	----

See footnotes at end of table.

TABLE 1.—*Mean dynamic height (geopotential) in units of 0.98 dynamic meters, temperature in degrees centigrade, and relative humidity in percent, for standard pressures, as obtained by radiosondes during July 1948*

Standard pressure surface (mb.)	Tampa, Fla. (1,016.8 mb.)				Tatoosh Island, Wash. (1,014.0 mb.)				Toledo, Ohio (991.4 mb.)				Washington, D. C. (1,012.4 mb.)			
	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity	Number of observations	Dynamic height	Temperature	Relative humidity
Surface	31	9	25.0	88	31	31	13.3	91	31	191	21.7	75	31	25	24.1	76
1,000	31	156	24.7	86	31	148	12.7	87	31	115	(*)	----	31	133	24.4	70
950	31	609	22.6	83	31	585	12.0	74	31	565	21.7	64	31	588	23.0	63
900	31	1,076	19.8	80	31	1,031	11.0	64	31	1,030	18.4	68	31	1,054	19.7	65
850	31	1,568	16.7	78	31	1,506	9.0	61	31	1,518	14.9	69	31	1,544	16.2	68
800	31	2,083	13.6	75	31	2,006	6.5	55	31	2,029	12.3	61	31	2,058	13.2	64
750	31	2,627	10.5	72	31	2,539	4.0	52	31	2,575	9.6	51	31	2,603	10.8	55
700	31	3,197	7.2	71	31	3,091	.9	50	31	3,139	6.8	45	31	3,172	7.8	52
650	31	3,806	3.5	75	31	3,688	−2.6	46	31	3,748	3.2	44	31	3,783	4.4	50
600	31	4,450	−.1	77	31	4,314	−6.3	45	31	4,389	−.4	41	31	4,427	.8	46
550	31	5,144	−3.7	78	31	4,993	−10.6	46	31	5,081	−4.3	40	31	5,122	−3.1	44
500	31	5,891	−7.7	79	31	5,716	−15.4	45	31	5,825	−8.8	39	31	5,871	−7.4	43
450	31	6,711	−12.2	76	31	6,512	−21.1	----	31	6,643	−14.0	----	31	6,690	−12.6	42
400	31	7,595	−18.0	78	31	7,363	−27.1	----	31	7,519	−20.0	----	31	7,573	−18.7	44
350	31	8,579	−24.9	----	31	8,312	−34.0	----	31	8,495	−26.8	----	31	8,555	−25.6	----
300	31	9,680	−33.2	----	31	9,373	−41.6	----	31	9,589	−34.8	----	31	9,654	−33.8	----
250	31	10,935	−43.2	----	31	10,589	−47.8	----	30	10,835	−44.4	----	31	10,905	−43.7	----
200	30	12,399	−55.3	----	31	12,051	−50.6	----	30	12,295	−54.2	----	26	12,366	−54.7	----
175	30	13,238	−61.7	----	31	12,920	−50.3	----	30	13,142	−58.8	----	25	13,212	−59.9	----
150	28	14,175	−67.3	----	31	13,926	−50.0	----	29	14,097	−62.3	----	21	14,157	−64.4	----
125	21	15,267	−69.9	----	31	15,116	−50.5	----	24	15,216	−64.6	----	15	15,258	−66.0	----
100	11	16,582	−70.7	----	30	16,570	−50.6	----	16	16,565	−63.7	----	7	16,601	−65.7	----
80	5	17,885	−65.5	----	29	18,024	−50.7	----	13	17,938	−60.9	----	----	----	----	----
60	----	----	----	----	28	19,898	−49.6	----	13	19,736	−58.0	----	----	----	----	----
50	----	----	----	----	23	21,093	−48.2	----	9	20,882	−56.5	----	----	----	----	----
40	----	----	----	----	12	22,558	−46.4	----	----	----	----	----	----	----	----	----

[1] Data not yet received.
[2] Insufficient observations.
*Temperature and relative humidity data for this level are not available or are available only for certain days. See note entitled "Change in Summarization of Radiosonde Data," p. 6, in the January 1946 issue of the MONTHLY WEATHER REVIEW.

NOTE.—All observations scheduled between 0300 and 0500, G. C. T. except at Ciudad Victoria, Mazatlan, and Merida, where they are taken near 0200 G. C. T. "Number of observations" refers to those of dynamic height only. (In a few cases temperature or humidity data may be missing for one or more standard pressure surfaces of some observations.) Relative humidity data are not published for standard pressure surfaces having a corresponding mean temperature below −20° C.

All relative humidity observations are obtained by electric hygrometer and have been adjusted to compensate for the values occurring below the operating range of the humidity element. For explanation of the adjustment, see article entitled "Curve Method for Obtaining Monthly Means of Relative Humidity," p. 241, MONTHLY WEATHER REVIEW, December 1944.

None of the means included in these tables are based on less than 15 observations at the surface or 5 observations at a standard pressure level.

TABLE 2.—*Free-air resultant winds based on pilot balloon observations made near 2200 G. C. T., during July 1948. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Speeds in meters per second*

Altitude (meters) m. s. l.	Abilene, Tex. (534 m.)			Albuquerque, N. Mex. (1,627 m.)			Atlanta, Ga. (299 m.)			Billings, Mont. (1,095 m.)			Bismarck, N. Dak. (512 m.)			Boise, Idaho (868 m.)			Brownsville, Tex. (7 m.)			Buffalo, N. Y. (220 m.)			Burlington, Vt. (100 m.)			Charleston, S. C. (16 m.)			Cincinnati, Ohio (273 m.)			Denver, Colo. (1,618 m.)			El Paso, Tex. (1,198 m.)		
	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed
Surface	31	175	4.2	31	218	2.5	31	241	0.4	31	27	1.1	31	254	1.8	31	318	4.8	31	142	6.4	31	254	4.5	30	245	1.2	30	178	3.4	31	262	2.3	31	58	0.7	31	194	1.8
500	----	----	----	----	----	----	31	233	1.0	----	----	----	----	----	----	----	----	----	31	147	8.8	31	251	5.5	30	247	3.0	30	192	5.1	31	258	2.8	----	----	----	----	----	----
1,000	31	171	5.5	----	----	----	30	248	1.8	----	----	----	31	266	2.5	31	316	5.3	30	156	8.3	29	247	6.0	29	276	5.0	29	215	4.2	30	262	3.6	----	----	----	----	----	----
1,500	31	168	5.7	----	----	----	28	279	2.6	31	71	1.8	31	272	3.3	31	316	4.7	30	159	7.2	28	256	4.9	29	278	6.3	29	239	3.7	30	269	3.4	----	----	----	31	194	2.0
2,000	31	175	6.0	31	238	2.4	26	289	2.7	31	135	1.1	30	270	4.4	31	307	3.4	30	158	5.6	23	269	4.5	28	278	8.2	29	247	3.4	28	280	4.4	31	64	1.1	31	180	1.5
2,500	30	179	5.3	31	237	2.0	24	301	3.5	31	198	1.9	29	270	5.4	31	263	3.4	29	147	4.7	20	272	6.3	25	277	9.1	27	237	3.4	22	278	5.1	31	93	1.0	31	173	1.5
3,000	28	189	3.9	31	240	1.6	23	310	3.5	28	237	4.2	27	273	6.8	31	251	4.6	29	149	4.3	18	280	7.1	21	279	10.2	26	238	3.3	20	287	5.9	31	111	.9	31	134	1.3
4,000	20	234	1.4	31	286	1.9	17	305	4.3	27	246	9.3	20	275	9.7	28	239	8.4	27	147	4.0	10	286	10.4	14	296	12.0	23	230	3.8	17	295	6.4	31	270	2.4	30	115	1.4
5,000	16	311	2.6	31	296	2.5	14	299	5.0	22	246	12.5	16	272	11.4	27	238	11.7	26	138	3.8	----	----	----	10	296	15.9	16	266	3.4	11	295	6.0	28	271	6.1	28	96	1.0
6,000	11	287	1.5	31	278	3.8	11	299	5.9	17	248	17.2	14	266	11.6	25	236	12.7	22	136	2.3	----	----	----	----	----	----	14	262	4.0	10	289	7.6	25	272	9.4	25	12	1.3
8,000	----	----	----	28	261	4.9	----	----	----	11	247	19.3	----	----	----	18	254	17.2	13	118	1.5	----	----	----	----	----	----	----	----	----	----	----	----	20	277	13.2	22	351	2.3
10,000	----	----	----	23	276	8.9	----	----	----	----	----	----	----	----	----	12	260	19.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	17	271	16.8	17	309	3.7
12,000	----	----	----	21	277	11.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	13	313	9.0
14,000	----	----	----	16	275	9.0	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	12	309	6.7
16,000	----	----	----	11	264	5.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

Altitude (meters) m. s. l.	Ely, Nev. (1,910 m.)			Grand Junction, Colo. (1,475 m.)			Greensboro, N. C. (271 m.)			Havre, Mont. (767 m.)			Jacksonville, Fla. (16 m.)			Joliet, Ill. (178 m.)			Las Vegas, Nev. (575 m.)			Little Rock, Ark. (88 m.)			Medford, Oreg. (416 m.)			Miami, Fla. (12 m.)			Mobile, Ala. (66 m.)			Nashville, Tenn. (194 m.)			New York N. Y. (15 m.)		
	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed
Surface	31	201	4.6	31	291	1.6	30	222	0.9	30	262	2.2	25	122	2.2	31	256	2.1	31	189	3.0	31	204	1.2	30	300	2.2	31	125	3.7	31	180	1.4	31	253	1.7	30	209	2.7
500	----	----	----	----	----	----	30	216	2.2	----	----	----	25	165	1.8	31	253	2.3	----	----	----	31	212	2.0	30	305	2.1	31	133	4.9	31	196	2.5	31	277	2.7	30	242	4.3
1,000	----	----	----	----	----	----	30	234	2.7	30	261	2.7	25	202	2.1	31	248	3.0	31	192	5.2	30	233	2.5	30	310	3.0	31	136	4.4	31	225	1.4	30	274	2.6	30	265	5.5
1,500	----	----	----	31	288	1.8	29	258	3.2	30	253	3.1	25	207	2.2	29	267	3.7	31	197	5.4	28	246	2.7	30	301	2.3	31	136	3.8	30	318	1.3	29	281	1.9	30	273	6.7
2,000	31	203	5.2	31	270	3.0	27	265	4.1	30	246	4.2	23	229	1.6	28	290	4.8	31	198	6.4	25	278	2.1	30	249	1.9	31	132	3.4	26	336	2.2	26	287	2.6	29	278	7.1
2,500	31	207	6.6	31	254	4.0	27	276	4.3	27	242	6.2	23	242	2.2	25	282	6.0	31	200	6.9	23	289	2.5	30	222	3.0	30	138	3.1	20	332	2.5	22	298	2.8	25	282	7.7
3,000	31	216	6.7	31	248	4.5	23	284	5.7	27	252	7.7	21	219	2.0	22	284	6.3	31	203	6.6	23	291	2.5	30	229	3.4	30	143	3.1	19	350	2.7	21	297	3.4	18	288	7.9
4,000	31	212	6.2	31	245	5.6	19	293	7.0	20	245	11.6	19	221	2.1	15	282	8.1	31	219	7.4	16	310	2.1	29	242	5.5	28	161	3.0	15	349	3.1	18	305	3.9	----	----	----
5,000	29	218	8.0	29	244	7.3	16	292	7.3	19	254	13.8	16	196	1.5	12	298	7.7	30	226	9.0	----	----	----	28	252	8.0	23	150	2.7	----	----	----	15	305	6.5	----	----	----
6,000	26	232	9.9	27	244	8.4	13	295	6.8	18	250	16.9	13	182	1.8	----	----	----	29	230	8.9	----	----	----	26	246	9.4	19	124	2.6	----	----	----	11	281	7.2	----	----	----
8,000	19	236	12.4	22	254	11.4	----	----	----	----	----	----	----	----	----	----	----	----	28	240	9.9	----	----	----	22	244	13.2	----	----	----	----	----	----	----	----	----	----	----	----
10,000	17	238	15.8	17	255	15.5	----	----	----	----	----	----	----	----	----	----	----	----	24	245	14.4	----	----	----	11	243	16.5	----	----	----	----	----	----	----	----	----	----	----	----
12,000	12	259	19.1	16	262	20.1	----	----	----	----	----	----	----	----	----	----	----	----	20	253	18.9	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
14,000	----	----	----	10	270	23.0	----	----	----	----	----	----	----	----	----	----	----	----	11	257	16.7	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

TABLE 2.—*Free-air resultant winds based on pilot balloon observations made near 2200 G. C. T., during July 1948. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Speeds in meters per second*—Continued

Altitude (meters) m. s. l.	Oakland, Calif. (8 m.)			Oklahoma City, Okla. (396 m.)			Omaha, Nebr. (306 m.)			Phoenix, Ariz. (338 m.)			Rapid City, S. Dak. (982 m.)			St. Louis, Mo. (181 m.)			St. Cloud, Minn. (318 m.)			San Antonio, Tex. (240 m.)			San Diego, Calif. (13 m.)			Sault Ste. Marie, Mich. (221 m.)			Seattle, Wash. (116 m.)			Spokane, Wash. (725 m.)			Washington, D. C. (24 m.)		
	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed
Surface	31	280	5.1	31	171	4.5	31	210	2.6	31	235	1.0	31	61	1.2	30	226	0.7	31	223	1.7	31	159	3.4	30	271	3.5	30	277	2.9	31	264	1.8	31	222	2.6	31	209	1.9
500	31	274	4.2	31	174	4.0	31	211	2.7	31	244	1.9	---	---	---	30	227	1.2	31	234	2.2	31	156	4.8	30	265	2.3	30	273	4.3	31	266	1.6	---	---	---	31	237	3.7
1,000	31	263	3.7	31	190	5.7	31	220	3.0	31	245	3.0	31	60	1.2	30	242	2.3	29	235	3.3	31	157	5.4	28	235	2.0	30	277	5.4	29	230	1.6	31	227	4.0	29	235	4.6
1,500	30	260	3.3	31	206	6.2	31	227	3.8	31	236	3.3	31	111	.9	29	270	3.1	29	239	3.1	31	158	5.3	28	247	2.3	27	276	6.4	25	225	3.0	31	223	3.7	29	259	5.4
2,000	30	243	2.9	30	215	6.3	29	240	5.3	31	233	3.5	30	195	1.7	24	286	4.8	24	258	4.6	31	162	5.1	28	241	3.5	26	280	6.8	25	222	3.8	31	227	3.6	27	280	6.8
2,500	30	239	3.0	29	223	6.0	28	252	6.1	30	229	4.0	28	229	4.2	22	294	6.1	23	264	6.7	25	173	5.3	28	227	4.6	25	286	7.9	24	221	4.4	28	225	4.0	27	285	8.4
3,000	30	226	3.2	27	236	5.6	28	257	7.1	30	224	3.8	27	254	6.2	19	281	5.9	21	265	8.1	24	174	4.5	28	223	5.6	22	283	9.0	23	235	4.4	25	227	5.6	26	286	10.0
4,000	30	230	5.4	23	253	4.6	24	268	7.2	29	220	4.0	25	269	9.7	13	304	4.8	18	267	10.9	21	164	3.0	28	225	6.8	19	294	10.7	18	250	5.4	21	240	7.8	23	280	11.4
5,000	30	239	6.8	21	279	4.8	22	265	7.2	28	215	4.8	22	275	11.0	---	---	---	16	270	13.3	17	156	2.1	27	222	7.0	15	298	12.7	16	252	7.6	18	245	10.0	18	279	13.0
6,000	30	240	7.8	14	305	4.5	22	274	8.0	26	203	4.0	18	265	11.2	---	---	---	12	279	15.3	14	156	1.3	27	226	7.4	12	301	13.7	15	244	10.2	14	249	10.9	15	275	12.6
8,000	28	247	10.8	---	---	---	17	264	11.3	20	239	5.5	15	262	11.5	---	---	---	---	---	---	---	---	---	26	234	7.3	---	---	---	10	264	10.0	---	---	---	---	---	---
10,000	25	251	15.2	---	---	---	15	272	15.9	14	255	11.3	---	---	---	---	---	---	---	---	---	---	---	---	25	242	10.8	---	---	---	---	---	---	---	---	---	---	---	---
12,000	22	254	20.2	---	---	---	10	276	17.9	10	245	16.6	---	---	---	---	---	---	---	---	---	---	---	---	19	242	12.8	---	---	---	---	---	---	---	---	---	---	---	---
14,000	12	253	22.9	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	14	247	9.0	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 3.—*Free-air resultant winds based on rawin observations made near 0300 G. C. T., during July 1948. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Speeds in meters per second*

Altitude (meters) m. s. l.	Albuquerque, N. Mex. (1,636 m.)			Big Spring, Tex. (774 m.)			Bismarck, N. Dak. (505 m.)			Brownsville, Tex. (7 m.)			Caribou, Maine (191 m.)			Charleston, S. C. (13 m.)			Columbia, Mo. (237 m.)			Grand Junction, Colo. (1,473 m.)			Greensboro, N. C. (275 m.)			Hatteras, N. C. (3 m.)			International Falls, Minn. (358 m.)			Little Rock, Ark. (80 m.)			Miami, Fla. (12 m.)		
	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed
Surface	31	155	3.2	31	143	4.4	31	3	0.6	31	133	4.2	31	243	1.4	31	190	1.7	31	162	1.6	31	202	0.5	31	182	0.8	31	212	4.1	31	188	0.5	31	135	0.7	31	94	1.6
500	---	---	---	---	---	---	---	---	---	31	142	10.9	29	277	5.3	31	205	6.2	30	189	3.0	---	---	---	31	202	3.3	30	228	7.2	31	216	1.6	31	150	2.2	31	127	4.6
1,000	---	---	---	31	154	8.1	31	277	1.5	31	146	10.5	29	290	6.4	31	212	4.3	30	221	2.9	---	---	---	31	219	4.5	30	227	5.1	31	258	3.0	31	187	2.7	31	132	4.9
1,500	---	---	---	31	163	8.9	30	255	2.0	31	147	8.0	30	287	7.5	31	221	3.1	30	248	2.6	31	200	.6	31	235	3.9	30	247	4.6	31	273	3.9	31	209	3.0	31	134	4.2
2,000	30	182	2.1	31	169	6.6	30	273	3.2	31	146	6.7	30	287	7.0	31	237	2.8	30	273	3.2	31	228	2.3	31	252	3.7	30	254	4.9	31	284	4.6	31	237	2.7	31	131	3.7
2,500	30	196	2.4	31	164	3.8	30	278	4.5	31	150	5.3	30	285	8.1	31	236	2.2	31	280	3.4	31	242	2.8	31	264	3.1	31	255	5.2	31	283	6.0	31	264	2.6	31	126	3.4
3,000	30	215	2.6	31	142	1.8	29	282	5.9	31	144	4.4	31	288	8.2	31	220	2.0	31	293	3.7	31	252	3.2	30	277	3.3	31	256	5.3	31	286	7.6	31	271	2.7	31	131	3.2
4,000	31	264	2.2	31	32	2.5	30	286	9.2	31	132	3.9	30	273	10.2	31	226	1.8	31	307	5.7	31	246	4.3	29	291	3.4	30	261	6.0	31	286	8.6	31	282	3.2	31	132	2.1
5,000	31	310	2.8	31	24	2.5	29	285	10.0	31	141	3.5	30	275	11.7	31	226	1.8	31	300	5.8	30	251	5.2	29	272	3.0	29	254	6.2	31	288	10.8	31	293	3.1	31	122	2.3
6,000	30	305	4.1	31	14	1.6	28	284	12.1	31	132	2.7	30	273	13.9	31	237	1.2	31	295	6.2	29	255	7.1	29	287	4.8	29	278	5.9	30	291	12.8	31	253	3.4	30	112	2.6
8,000	31	274	5.4	30	360	1.4	27	276	14.3	30	116	2.7	25	274	17.6	31	286	1.7	31	275	9.1	27	257	11.0	28	287	6.3	26	283	4.5	26	289	13.6	31	281	5.3	30	73	2.5
10,000	29	278	7.5	30	286	2.3	27	263	17.8	31	110	1.1	18	283	20.6	30	292	3.3	30	264	14.6	25	257	14.3	28	284	7.5	22	298	5.0	19	277	18.4	31	261	8.9	30	34	5.3
12,000	28	273	10.1	30	287	3.9	24	263	23.2	30	150	1.1	---	---	---	30	312	4.5	28	262	17.9	20	262	14.5	27	281	7.8	19	291	9.1	17	279	22.8	30	252	8.8	30	21	8.1
14,000	24	270	7.0	28	345	2.0	23	269	17.1	27	91	2.7	---	---	---	30	359	4.9	20	266	15.4	16	267	14.6	26	297	7.8	14	342	6.8	12	291	18.1	30	263	5.4	27	47	8.4
16,000	---	---	---	15	93	2.5	---	---	---	17	80	7.8	---	---	---	23	65	6.7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	16	312	.8	13	72	8.1

Altitude (meters) m. s. l.	Nantucket, Mass. (14 m.)			Nashville, Tenn. (177 m.)			New Orleans, La. (6 m.)			Oakland, Calif. (31 m.)			Oklahoma City, Okla. (392 m.)			Rapid City, S. Dak. (980 m.)			St. Cloud, Minn. (318 m.)			San Antonio, Tex. (242 m.)			San Juan, P. R. (28 m.)			Santa Maria, Calif. (72 m.)			Sault Ste. Marie, Mich. (221 m.)			Spokane, Wash. (726 m.)			Tatoosh Island, Wash. (33 m.)		
	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed	Observations	Direction	Speed
Surface	31	225	3.1	31	198	1.0	31	194	1.5	31	280	5.2	31	152	3.8	31	308	1.0	31	112	0.2	31	147	5.4	31	99	5.5	31	271	4.5	31	287	1.2	31	189	1.3	31	212	2.6
500	30	257	8.0	30	206	2.2	31	219	2.7	31	278	5.2	31	157	5.6	---	---	---	31	177	.7	31	147	8.0	31	92	10.1	31	302	3.0	30	302	2.9	---	---	---	31	268	4.6
1,000	29	276	7.1	30	225	2.8	31	157	.2	31	282	4.8	31	178	9.0	30	311	.9	31	237	3.3	31	148	8.6	30	97	10.8	31	318	3.3	30	297	4.7	31	234	2.3	31	26e	3.0
1,500	29	279	7.2	30	237	3.4	31	45	2.1	31	274	3.4	31	200	7.7	30	241	1.1	31	259	4.9	31	152	5.5	30	96	10.2	31	346	2.2	31	291	6.0	31	255	3.5	31	252	2.2
2,000	30	276	7.3	31	257	3.5	31	53	3.1	31	259	3.1	31	219	5.8	30	232	3.0	31	272	5.2	31	168	4.1	30	99	10.1	31	43	.8	30	293	7.0	31	257	4.6	31	258	1.9
2,500	31	284	7.6	31	253	3.2	31	47	3.3	31	259	2.6	31	232	4.2	31	254	4.7	30	280	6.1	31	171	3.8	30	96	10.3	31	243	1.5	28	291	6.4	31	253	5.2	31	269	2.6
3,000	31	273	8.2	31	270	2.9	31	37	3.0	31	260	2.7	31	254	2.4	31	267	6.2	30	252	7.1	31	162	3.8	30	102	9.8	31	249	3.7	28	291	7.2	31	252	7.2	31	271	3.2
4,000	31	270	9.6	31	288	4.8	31	15	2.6	30	262	3.4	31	335	2.3	30	279	8.8	30	286	7.5	31	166	3.0	30	93	8.6	31	250	5.5	27	284	9.0	31	244	8.6	31	263	4.3
5,000	30	275	11.3	30	310	4.3	29	352	1.8	30	255	5.4	31	346	3.7	30	282	10.5	28	286	9.2	31	154	2.0	30	92	7.1	31	250	7.3	27	291	10.8	30	248	9.4	31	277	6.1
6,000	30	278	12.4	28	301	4.5	29	354	1.6	30	255	8.4	31	314	4.1	30	276	11.9	27	287	11.4	31	138	1.2	29	97	5.8	31	246	8.0	27	288	13.1	29	248	11.2	30	260	6.7
8,000	28	277	19.5	23	299	7.3	28	353	2.6	30	257	13.1	29	284	6.2	30	268	14.4	25	295	11.9	31	210	.4	29	152	2.3	30	252	10.4	22	284	16.0	25	246	16.8	29	253	11.8
10,000	22	279	20.0	21	301	9.2	27	14	4.1	30	251	18.8	25	273	8.4	30	262	18.2	25	275	17.1	30	164	1.4	29	226	3.9	26	256	13.5	17	283	18.4	17	269	16.6	27	253	14.4
12,000	14	300	25.7	18	300	12.9	26	25	5.0	23	260	19.5	24	274	10.9	24	252	19.0	18	270	17.3	28	70	1.8	29	256	6.5	22	252	14.6	---	---	---	---	---	---	25	256	13.3
14,000	---	---	---	---	---	---	24	69	5.6	22	261	22.0	23	288	6.0	17	254	15.2	---	---	---	25	68	4.1	28	261	6.2	---	---	---	---	---	---	---	---	---	---	25	250	10.2
16,000	---	---	---	---	---	---	12	56	7.3	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	14	89	5.5	---	---	---	---	---	---	---	---	---	---	23	246	5.5
18,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	22	202	1.6
20,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	21	76	2.9
22,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	100	7.3

NOTE.—Resultants prepared from rawins at high altitudes are biased toward lower wind speeds. Values appearing in this table should therefore be used with caution when the number of observations missing is greater than three. See note following Table 3 in the June 1948 issue of the MONTHLY WEATHER REVIEW.

RIVER STAGES AND FLOODS FOR JULY 1948

ELMER R. NELSON

River stages during July were below normal along the Atlantic and Gulf Coasts except in Georgia and southern Texas. Over the rest of the country it was mostly above normal except at scattered points. The greatest negative departure was along the lower Mississippi at Vicksburg, Miss., where it averaged 5.2 feet below normal. The greatest positive departure was along the Arkansas at Van Buren and Little Rock, Ark., where the river stages averaged 12.3 and 11.1 feet above normal respectively. Precipitation during the month was very spotty, with the heaviest amounts (twice normal) reported in the central portion of the country and along the Canadian Border from Minnesota west-southwestward to northern California.

A flash flood occurred in the extreme headwaters of the Hocking River in the vicinity of Lancaster, Ohio, which resulted in considerable damage. The highest stage of record since 1903 occurred in portions of the Smoky Hill River Basin in Kansas below Kanopolis Dam, and record stages were exceeded at practically every point in the Neosho River Basin. Moderate flooding occurred in the Osage River in Kansas and the middle portion of the Kansas River Basins.

East Gulf of Mexico.—Moderate to heavy rain from the 9th through the 16th caused light to moderate flooding along the Chattahoochee River in Alabama and the Apalachicola in Florida. The rainfall over the Chattahoochee basin during the 8-day period averaged from 6 to 15 inches, with the heaviest 24-hour amounts (1 to 8 inches) occurring on the 10th and 11th. Most of the resulting damage (washing of farmlands) was due to the heavy rains rather than to the overflow.

Missouri Basin.—Moderate to severe flooding occurred on the Solomon River in Kansas with crests 5 to 7 feet above bank-full stage. The river, at Minneapolis, Kans., exceeded the previous maximum stage (32 feet, recorded in 1903) by 0.17 foot on the 21st. The crest of 29.6 feet at Niles, Kans., on the 20th was the third highest stage of record. About 63,000 acres of farm land were inundated, causing severe damage to growing crops and heavy damage to highways and bridges. Railway service in the Solomon Basin was interrupted for 16 days.

Light flooding occurred on the Saline River at Tescott, Kans., on the 20th and 21st.

Serious flooding occurred for 7 days along the lower Smoky Hill River, below the junction with the Solomon River. The crest at Enterprise, Kans., approached within ½ foot of the maximum stage of record (30.1 feet, Oct. 21, 1941). The greatest damage occurred to growing crops, with 15,000 acres of fertile farm land inundated.

The flooding along the Republican River was mostly light and of short duration. The overflowing creeks caused moderate damage to highways and bridges, inundating approximately 200 acres.

Moderate overflows occurred on the Kansas River from Ogden to Manhattan, Kans., with light flooding below Manhattan. One bridge span was washed out at Ogden, Kans., and 500 acres were inundated in the basin, with negligible damage to growing crops.

Moderate flooding occurred along the upper portion of the Osage River in Kansas, with severe and prolonged flooding from LaCygne to the Missouri-Kansas state line. The crest of 30.6 feet at LaCygne, Kans., approached the record stage of 31.9 feet established on April 24, 1944. Approximately 40,000 acres were inundated, with severe damage occurring to growing and stored crops. Moderate damage occurred to bridges and highways.

Two lives were lost in the July floods in the Missouri Basin.

Ohio Basin.—A heavy rainstorm on the 21st–22d in the upper Hocking River Basin caused a severe flash flood, with considerable damage in the vicinity of Lancaster, Ohio. This storm was of short duration (2–3 hours), with the rainfall during that period averaging approximately 6 inches. Farther downstream at Athens, Ohio, the Hocking crested at a stage of 16.75 feet, 0.25 foot below bank-full stage, on the evening of the 24th.

Heavy rains on the 20th–21st, ranging from 1 to 5 inches caused a sharp rise in the White River in Indiana to a crest slightly above bank-full stage on the 24th. A flash flood on the 21st on Honey and Sulton Creeks at Smith's Valley, Ind., washed out 2 small bridges and flooded several basements. Another heavy rain on the 28th, ranging from 1 to 3 inches, caused another rise on the White River to 4 feet above bank-full stage at Edwardsport. No damage resulted from the overflows along the White River.

Arkansas Basin.—Severe flooding occurred in Kansas along the Cottonwood and Neosho Rivers due to frequent heavy rains, averaging 8.85 inches over the Cottonwood, 10.35 inches over the Upper Neosho above Iola, Kans., and 8.85 inches over the Lower Neosho above Oswego, Kans., during the last half of July. The Cottonwood exceeded by 1.8 feet the previous record stage of 27.7 feet recorded on April 23, 1944, at Emporia, Kans., and it approached within 0.3 foot of the record stage at Cottonwood Falls, Kans. Record stages were exceeded on the Neosho from Neosho Rapids to Oswego, Kans. Comparison with the previous maximum of record is given in Table 1. Approximately 150,000 acres of farm land were inundated, causing severe damage to growing crops.

Flood stages continued from the June floods until the 6th at Dewar, Okla., on the Deep Fork Creek. Heavy showers again caused the Deep Fork Creek to go above bank-full stage from the 11th through the 21st.

TABLE 1.—*Comparative Neosho River crests*

[All dates in July unless otherwise specified]

Station	Flood stage	1948 crest		Previous maximum crest of record	
		Crest	Date	Crest	Date
	Feet	*Feet*		*Feet*	
Emporia, Kans.	20	27.9	20	27.1	July 5, 1904
Neosho Rapids, Kans.	22	29.9	21	28.2	Apr. 23, 1944
Burlington, Kans.	27	36.8	21	35.0	Apr. 24, 1944
LeRoy, Kans.	23	30.7	22	29.7	do.
Iola, Kans.	15	24.6	23	22.65	Apr. 25, 1944
Chanute, Kans.	20	30.9	23	29.6	Apr. 26, 1944
Erie, Kans.	20	28.2	24	28.8	Sept. 14, 1926; Apr. 9, 1927
Parsons, Kans.	24	31.2	27	29.7	Apr. 27, 1944
Oswego, Kans.	17	27.4	27	25.9	Apr. 28, 1944

West Gulf of Mexico.—The East Fork of the Trinity River crested at a stage of 11 feet at Rockwall, Tex., 1 foot above bank-full stage, on the 6th, with negligible damage.

Heavy rains over the Devil's River and Sycamore Creek drainage in the Del Rio, Tex., area on the morning of the 4th resulted in a moderately high rise in both streams, with the second highest stage of record occurring on the Devil's River, since September 1, 1932, at Juno, Tex. (discharge 240,000 cfs.) on the 4th. As this flood moved downstream, it caused considerable damage to the temporary bridges of the Southern Pacific Railroad and the State Highway Department, erected as a result of the damaging flood on June 24. Very little damage would have occurred in this area under normal conditions.

A major rise occurred in the lower Rio Grande as a result of the heavy rains over the basin during the latter part of June. Another rise began on the 4th and 5th which resulted in above bank-full stage at several stations. Damage from both overflows was confined to growing crops.

FLOOD STAGE REPORT FOR JULY 1948

[All dates in July unless otherwise specified]

River and station	Flood stage	Above flood stages—dates From—	To—	Crest [1] Stage	Date
EAST GULF OF MEXICO DRAINAGE					
Chattahoochee:	*Feet*			*Feet*	
Eufaula, Ala.	40	13	14	42.1	13–14
Columbia, Ala.	42	14	14	43.3	14
Apalachicola:					
Chattahoochee, Fla.	20	16	17	20.2	17
Blountstown, Fla.	15	12	28	21.3	17
MISSISSIPPI SYSTEM					
Upper Mississippi Basin					
Mississippi: Louisiana, Mo.	12	June 29	1	12.2	June 30
		5	6	12.2	6
		22	23	12.2	22, 23
		25	26	12.3	26
Missouri Basin					
Solomon: Beloit, Kans.	18	June 19	June 22	25.2	June 21
Saline: Tescott, Kans.	25	20	21	26.0	21
Smoky Hill:					
Abilene, Kans.	22	20	26	25.3	22
				26.1	23
Enterprise, Kans.	26	June 20	June 26	29.6	June 21
Red Willow: McCook, Nebr.	12	9	9	12.6	9
Republican:					
Cambridge, Nebr.	5	9	9	6.8	9
		29	29	5.6	29
Clay Center, Kans.	15	June 10	June 10	15.1	June 10
		June 21	June 21	16.0	June 21
		June 25	June 25	15.3	June 25
		10	10	15.1	10
		20	21	16.0	21
Kansas:					
Ogden, Kans.	18	20	23	22.0	20
Manhattan, Kans.	17	20	24	22.7	20
Wamego, Kans.	16	June 21	June 21	16.8	June 21
Topeka, Kans.	21	June 21	June 21	21.8	June 21
Lecompton, Kans.	17	June 21	June 21	17.6	June 21
Grand:					
Chillicothe, Mo.	18	June 24	June 24	19.8	June 24
Brunswick, Mo.	12	June 24	June 25	13.9	June 25
Pottawatomie: Garnet, Kans.	26	20	21	28.9	20
Osage:					
Quenemo, Kans.	30	21	23	35.3	21
		27	27	31.0	27
Ottawa, Kans.	24	22	24	28.5	23
Osawatomie, Kans.	28	21	25	34.2	23–24
		26	28	32.2	27
LaCygne, Kans.	25	20	30	30.2	25
				30.6	26
Trading Post, Kans.	24	21	31	27.2	23
				28.3	27
Osceola, Mo.	22	June 23	----------	28.9	June 24
Warsaw, Mo.	31	June 22	----------	36.0	June 24
				35.6	June 26
				35.4	June 29
Lakeside (Bagnell Dam), Mo.	60	June 22	4	63.1	June 24
				62.4	June 29
St. Thomas, Mo.	23	June 22	3	30.6	June 27–28
Gasconade: Jerome, Mo.	15	June 19	June 19	15.0	June 19

FLOOD STAGE REPORT FOR JULY 1948—Continued

[All dates in July unless otherwise specified]

River and station	Flood stage	Above flood stages—dates From—	To—	Crest [1] Stage	Date
MISSISSIPPI SYSTEM—continued					
Missouri Basin—Continued					
Missouri:	*Feet*			*Feet*	
Jefferson City, Mo.	23	June 26	June 26	23.2	June 26
Ohio Basin					
White: Edwardsport, Ind.	12	23	25	13.5	24
		29	31	16.1	30
Arkansas Basin					
Little Arkansas: Sedgwick, Kans.	18	18	24	20.4	18
				22.2	23
Ninnescah: Peck, Kans.	17	23	23	17.4	23
Walnut: Arkansas City, Kans.	16	16	17	18.0	17
Verdigris:				34.1	17
Independence, Kans.	30	16	25	40.3	20
				42.3	23
Coffeyville, Kans.	20	18	25	22.7	24
Claremore, Okla.	38	18	29	44.8	23
Inola, Okla.	41.5	16	30	49.3	25
Cottonwood:					
Cottonwood, Falls, Kans.	9	19	22	15.7	20
Emporia, Kans.	20	19	25	29.5	20
Neosho:					
Emporia, Kans.	20	20	23	27.9	20–21
				21.8	23
Neosho Rapids, Kans.	22	20	25	29.9	21
Burlington, Kans.	27	19	26	30.8	21
LeRoy, Kans.	23	19	26	28.65	20
				30.7	22
Iola, Kans.	15	19	28	18.0	18
				24.6	23
Chanute, Kans.	20	18	29	30.9	23
Erie, Kans.	20	18	29	28.2	24
Parsons, Kans.	24	18	31	30.8	25
				31.2	27
				22.9	20
Oswego, Kans.	17	18	Aug. 1	27.3	26
				27.4	27
Deep Fork: Dewar, Okla.	18	June 22	6	25.2	June 24
		11	21	20.7	15
Arkansas:					
Great Bend, Kans.	8	19	22	9.1	19
		1	1	6.3	1
Hutchinson, Kans.	6	15	15	6.0	15
		17	24	8.2	22
Wichita, Kans.	9	June 29	June 29	9.2	June 29
		19	24	11.4	23
Oxford, Kans.	14	23	24	14.7	24
Arkansas City, Kans.	16	1	1	18.6	1
		16	20	19.2	16
		22	26	19.8	24
WEST GULF OF MEXICO DRAINAGE					
East Fork: Rockwall, Tex.	10	6	6	11.0	6
Rio Grande:					
Del Rio, Tex.	15	4	5	24.8	4
		5	5	18.1	5
Eagle Pass, Tex.	16	5	6	26.8	5
				16.3	6
Rio Grande City, Tex.	21	8	8	23.4	8
Hidalgo, Tex.	21	June 30	1	21.8	1
		9	10	21.3	9–10
Mercedes, Tex.	21	June 29	2	22.3	1
		8	11	22.8	10
PACIFIC SLOPE DRAINAGE					
Columbia Basin					
Columbia: Boundary, Wash.	32	May 27	2	45.0	June 11–12

[1] Provisional.

[2] Continued at end of month.

CLIMATOLOGICAL DATA FOR JULY 1948

CONDENSED CLIMATOLOGICAL SUMMARY OF TEMPERATURE AND PRECIPITATION, BY SECTIONS

[For description of tables and charts, see REVIEW, January 1943, p. 15]

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

Section	Temperature								Precipitation					
			Monthly extremes								Greatest monthly		Least monthly	
	Section average	Departure from the normal	Station	Highest	Date	Station	Lowest	Date	Section average	Departure from the normal	Station	Amount	Station	Amount
	°F.	°F.		°F.			°F.		In.	In.		In.		In.
Alabama	81.2	+0.9	2 stations	104	[1]3	Valley Head	53	25	6.23	+0.64	Columbia	19.92	Pushmataha	1.91
Arizona	80.8	+.6	Mohawk	117	8	Ft. Valley	27	9	1.64	−.45	Rucker Canyon	5.96	Salome	T
Arkansas	80.5	.0	Magnolia	105	25	Bethseda	51	2	4.11	+.44	Pine Bluff	9.09	Walnut Grove	.84
California	71.4	−2.2	Cow Creek	124	17	Boca	27	5	.10	+.01	Palm Springs	2.80	465 stations	.00
Colorado	67.5	+.3	2 stations	105	[1]14	Pearl	23	9	1.39	−.74	Stonington	4.61	Erie	T
Florida	81.4	+.1	3 stations	99	[1]7	Taniami Trail	62	3	10.44	+3.06	St. Marks	21.15	Miami Beach	1.91
Georgia	80.1	+.1	do	103	[1]4	2 stations	53	25	7.67	+1.96	Ft. Gaines	17.69	Alapaha	3.55
Idaho	65.3	−2.8	Grandview	106	22	Grouse	22	28	1.13	+.47	Roland (West Portal)	4.34	4 stations	.00
Illinois	75.5	−.9	Alton Dam	100	28	Virden	38	29	5.72	+2.55	La Harpe	14.54	Waukegan	.75
Indiana	74.9	−.7	Jeffersonville	100	[1]4	La Porte	46	[1]1	4.35	+1.04	Bedford	11.24	Noblesville	1.00
Iowa	75.0	.0	Britt	106	6	2 stations	43	[1]1	4.14	+.53	Muscatine	11.13	Delaware	.59
Kansas	77.8	−1.3	Liberal	106	14	Burr Oak	45	23	6.09	+2.94	Erie	17.59	Ulysses	.76
Kentucky	76.6	−.4	Benham	103	5	Mammoth Cave Park	45	2	5.08	+.94	Rumsey Lock	12.09	Ashland Dam	1.90
Louisiana	83.8	+1.9	Winnfield	105	31	North Livingston	62	9	3.44	−2.61	Port Sulphur	10.98	Ashland	.24
Maryland-Delaware	76.5	+1.3	Hancock, Md	99	30	Oakland, Md	44	2	3.42	−.93	Bridgeville, Del	7.14	Williamsport, Md	.60
Michigan	69.2	.0	Munising	98	9	Watersmeet	29	1	2.34	−.37	Lapeer	7.22	Benton Harbor Arpt.	.57
Minnesota	70.5	+.5	St. Peter	105	6	Cloquet Forest Sta	34	1	3.40	+.15	International Falls	8.08	Rochester Airport	.51
Mississippi	82.8	+1.7	Crystal Springs	103	9	Batesville	59	2	4.44	−.63	Merrill	16.29	Chatham	.54
Missouri	77.4	−.3	Brookfield	102	7	Marble Hill	46	2	5.56	+2.02	St. Louis Airport	12.69	Poplar Bluff	1.09
Montana	64.9	−2.2	Wolf Point	108	5	West Yellowstone	20	18	2.41	+1.03	Richey	8.09	Wyola	.46
Nebraska	75.2	−.3	Hay Springs	108	5	4 stations	42	[1]23	3.26	+.20	Ashland	9.41	Agate	.57
Nevada	71.7	−.9	Overton	118	21	Sheldon	25	28	.05	−.33	San Jacinto	.97	Cottonwood Ranch	.00
New England	69.8	+.7	2 stations	97	[1]12	First Conn. Lake, N. H.	37	7	3.47	−.30	Hardwick, Mass	8.00	Sunday River, Maine	.99
New Jersey	74.7	+.8	4 stations	96	[1]5	2 stations	43	8	4.06	−.64	Rutherford	7.17	Berlin	1.29
New Mexico	73.8	+1.5	2 stations	107	[1]10	Selsor	30	13	1.49	−.93	Ruidso	5.58	E. G. Hill Ranch	T
New York	70.4	−.6	Dansville	99	12	McKeever	37	27	3.61	−.35	Hempstead	7.70	Honk Falls	.91
North Carolina	77.8	+.9	Albemarle	103	22	2 stations	41	2	4.89	−1.09	Rock House	18.54	Winston-Salem	.59
North Dakota	68.7	−.3	McLeod	108	8	Upham	34	27	4.03	+1.62	Pembina	10.68	Almont	1.61
Ohio	73.6	.0	Hillsboro	100	[1]3	Mill Port	45	2	3.69	−.10	Lowell	9.35	Ashland	1.09
Oklahoma	81.4	−.4	2 stations	107	[1]21	Goodwell	53	2	3.78	+1.01	Cusing	10.46	Gage	.54
Oregon	63.4	−3.0	Lake Creek	108	31	2 stations	26	[1]2	.88	+.45	Headworks	3.22	Jordan Valley	.02
Pennsylvania	72.0	−.1	2 stations	97	[1]1	Kane	38	8	3.81	−.49	Avoca	8.27	Sellersville	.50
South Carolina	80.5	+.7	do	102	[1]6	Caesar's Head	58	9	5.10	−.79	Myrtle Beach	11.65	Columbia	1.17
South Dakota	72.7	−.4	Milbank	104	4	2 stations	40	[1]17	3.61	+1.20	Canistota	9.94	Highmore	.73
Tennessee	78.6	+.9	2 stations	103	[1]5	Rugby	46	2	4.95	+.48	Loudon	8.78	Nashville Airport	1.65
Texas	83.5	+.5	Pecos	111	20	Socorro	50	9	2.28	−.30	Gordonville	11.98	4 stations	.00
Utah	70.7	−1.1	Greenriver	108	[1]10	East Portal	25	29	.35	−.54	Yellowstone R. S.	1.40	Corinne	.00
Virginia	75.8	+.5	Blackstone	100	6	2 stations	40	[1]2	3.91	−.77	Damascus	8.72	Moores Creek Dam	.48
Washington	62.9	−3.4	Dallesport	103	31	Stockdill Ranch	30	[1]2	1.74	+1.06	Palmer	4.92	Wapato	.05
West Virginia	73.3	+.2	Hinton	102	5	Kumbrabow St. Forest.	32	2	5.44	+.82	Sand Fork	10.50	Bluestone Dam	1.50
Wisconsin	70.8	+.7	Eau Clare	102	8	Land O'Lakes	29	1	3.01	−.40	Prentice	6.96	La Crosse	.71
Wyoming	66.2	+.3	Deaver	107	2	Bondurant	24	[1]26	1.08	−.23	Sheridan Field Sta	3.51	Farson	T
Alaska (June)	52.0	−.4	University Exp. Sta	91	18	Barrow	15	11	1.50	−.22	Whittier	13.23	Naknek	.00
Hawaii	74.1	+.1	4 stations	90	[1]18	Haleakala R. S	29	13	5.86	+.17	Kukui	42.00	3 stations	.00
Puerto Rico	79.4	+.8	Corozal	96	16	Garzas	59	[1]10	7.34	+.67	Rio Blanco	18.53	Borinquen Field	1.80
Hawaii (June)	73.4	+.2	Hoseae	91	[1]20	Haleakala R. S	40	[1]6	3.64	−1.14	Kukui	30.00	Camp K-3	.00

[1] Other dates also.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS FOR JULY 1948

District and station	Elevation of instruments: Barometer above sea level [1]	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Averages: Mean maximum	Mean minimum	Mean	Departure from normal	Extremes: Highest	Date	Lowest	Date	Greatest daily range	Total heating degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Departure from normal	Greatest in 24 hours	Days with 0.01 inch or more	Days with thunderstorms	Total snowfall (unmelted)	Snow, sleet, and ice on ground at end of month	Wind: Average hourly speed	Prevailing direction	Maximum velocity: Miles per hour	Direction	Date	Character of day (sunrise to sunset), number of days: Clear	Partly cloudy	Cloudy	Average cloudiness, tenths (sunrise to sunset)	Possible sunshine
NEW ENGLAND	*Ft.*	*Ft.*	*Ft.*	*Mb.*	*Mb.*	*Mb.*	°F.	°F.	°F.	°F.	°F.		°F.		°F.		°F.	%	*In.*	*In.*	*In.*			*In.*	*In.*	*m.p.h.*					*0-3*	*4-7*	*8-10*	*0-10*	%
Caribou [2]	628	5	33	988.5	1,011.2	----	76	53	64.8	+.2	86	11	45	7	35	62	56	74	2.73	−1.2	.58	9	5	0.0	0.0	----	nw.	--	----	--	0	18	13	7.1	--
Eastport	75	67	82	1,008.0	1,011.5	−2.4	72	52	61.9	+1.5	86	11	47	8	34	123	53	78	5.37	+2.3	2.48	13	5	.0	.0	7.4	s.	29	ne.	6	5	11	15	6.5	58
Portland, Maine [2]	103	6	43	1,008.5	1,012.2	−2.4	82	58	70.2	+4.5	94	11	50	3	35	14	59	70	1.24	−2.0	.62	9	0	.0	.0	7.4	w.	22	ne.	6	12	11	8	5.2	76
Concord [2]	289	5	45	1,002.4	1,012.9	−1.7	84	56	70.0	+2.6	93	12	46	9	39	3	60	72	2.41	−1.2	1.13	9	5	.0	.0	5.4	nw.	21	n.	6	8	11	12	5.9	67
Mt. Washington	6,274	5	37	808.9	1,019.4	----	55	42	48.6	−.6	66	12	30	7	22	505	46	90	3.28	−2.8	1.37	12	3	.0	.0	27.1	w.	--	----	--	2	11	18	7.5	32
Burlington [2]	403	6	51	998.0	1,012.2	−1.3	83	59	71.1	+.8	96	12	48	15	36	6	60	71	4.54	+1.0	1.94	14	7	.0	.0	7.6	s.	25	s.	18	7	16	8	5.6	60
Boston [2]	124	33	62	1,008.6	1,013.1	−1.5	84	65	74.5	+2.8	96	12	53	7	25	3	61	67	4.53	+1.0	1.53	11	7	.0	.0	10.6	sw.	33	ne.	6	6	13	12	5.9	70
Nantucket [2]	12	4	34	1,013.5	1,014.2	−.7	76	61	68.4	+.6	84	9	52	16	24	15	63	88	1.28	−1.6	.65	6	4	.0	.0	11.7	sw.	33	ne.	7	6	13	12	6.1	59
Block Island	26	11	46	1,012.5	1,013.5	−1.4	76	63	69.5	+1.1	83	30	55	7	18	4	64	88	2.27	−.8	.90	9	5	.0	.0	13.5	sw.	33	ne.	7	8	14	9	5.6	72
Providence [2]	159	65	60	1,007.8	1,013.5	−1.4	87	65	76.0	+2.6	96	12	55	7	30	0	63	76	5.13	+1.9	1.65	9	5	.0	.0	7.4	sw.	29	w.	6	6	17	8	5.7	73
Hartford [2]	159	5	44	1,008.1	1,013.9	−.7	85	62	73.4	+1.8	93	5	53	8	35	0	64	74	2.37	−2.0	1.08	8	4	.0	.0	7.1	s.	28	nw.	6	7	17	7	5.8	75
New Haven [2]	107	5	39	1,009.8	1,013.9	−1.3	81	63	72.0	+2.7	87	28	53	8	25	0	64	76	2.35	−1.7	.88	10	10	0	.0	5.7	sw.	17	ne.	7	8	19	4	5.5	72
MIDDLE ATLANTIC									76.2	+1.0								75	4.02	−.4														5.8	
Albany [2]	97	6	40	1,009.5	1,012.9	−1.3	84	58	71.0	+.1	94	12	50	3	35	0	60	70	2.71	−.1	1.07	8	5	.0	.0	6.7	s.	33	w.	6	7	18	6	5.6	75
New York [4]	314	415	454	1,003.4	1,014.2	−.7	83	68	75.6	+1.8	90	5	59	8	25	0	63	66	7.52	+3.3	3.28	11	7	.0	.0	11.5	sw.	43	w.	5	7	15	9	5.9	69
Allentown [2]	385	4	58	1,001.0	1,014.9	----	86	63	74.5	+.3	94	5	52	8	34	0	64	77	2.41	−2.2	.78	10	5	.0	.0	----	sw.	--	----	--	6	14	11	6.2	--
Harrisburg [2]	374	30	49	1,001.0	1,014.6	−.6	85	65	75.3	+.5	92	30	55	8	29	0	64	72	2.02	−1.8	1.09	10	7	0	0	6.1	w.	21	w.	6	6	7	18	6.7	64
Philadelphia [4]	114	174	150	1,010.5	1,014.6	−1.0	84	69	76.8	+.6	91	5	61	8	22	0	67	76	3.40	−.8	.79	9	6	.0	.0	6.3	s.	24	sw.	6	5	15	11	6.1	64
Reading	323	47	306	1,002.7	1,014.2	−1.0	86	67	76.2	+1.0	94	5	58	8	26	0	----	--	2.51	−1.8	.98	8	4	.0	.0	8.5	sw.	31	nw.	6	6	12	13	6.2	51
Scranton	805	72	104	984.8	1,013.5	−2.1	82	62	72.1	+.4	91	12	52	8	30	1	----	--	7.17	+3.1	3.12	9	7	.0	.0	5.4	n.	31	nw.	6	9	16	6	5.1	70
Atlantic City	52	37	172	1,012.5	1,014.2	−1.0	80	68	74.0	+1.9	89	6	60	8	25	0	68	84	4.08	+.2	1.39	8	7	.0	.0	13.0	s.	39	sw.	23	9	13	9	5.5	68
Newark [2]	30	5	46	1,013.2	1,014.2	----	87	66	76.7	+1.9	95	12	56	8	29	0	64	70	6.88	+2.2	2.79	12	4	.0	.0	----	sw.	--	----	--	6	15	10	6.2	--
Trenton	190	89	107	1,007.8	1,014.6	−.3	85	67	76.2	+1.7	93	5	59	8	26	0	----	--	4.59	+.6	1.81	12	5	.0	.0	7.5	s.	25	sw.	13	7	15	9	5.6	63
Baltimore [4]	123	100	215	1,010.5	1,014.9	−.3	86	71	78.7	+1.5	95	5	64	8	24	0	66	73	1.94	−2.7	1.16	11	8	.0	.0	9.2	s.	47	nw.	6	5	16	10	5.8	63
Washington [4]	112	56	100	1,012.9	1,015.2	.0	87	69	78.4	+1.6	95	5	58	9	26	0	66	70	3.60	−1.1	2.06	9	8	.0	.0	5.9	sw.	24	n.	6	5	16	10	6.1	74
Cape Henry	18	8	54	1,014.6	1,015.2	−.4	87	71	79.0	+1.5	96	6	66	3	27	0	70	80	2.64	−2.7	1.41	14	13	.0	.0	10.2	sw.	37	nw.	23	11	14	6	5.0	71
Lynchburg [2]	686	5	58	991.2	1,015.6	−.7	87	67	76.7	+.6	93	5	56	9	30	0	66	78	2.22	−2.0	.56	12	11	.0	.0	6.8	sw.	25	w.	20	6	16	9	6.1	67
Norfolk [4]	91	80	125	1,012.5	1,015.9	−.4	88	72	79.8	+1.1	95	22	66	9	25	0	69	77	4.86	−.9	3.09	9	13	.0	.0	9.0	sw.	27	nw.	23	9	7	15	6.2	70
Richmond [4]	144	11	52	1,009.8	1,014.9	−1.0	88	69	78.6	+1.1	94	22	56	9	27	0	68	76	5.79	+1.1	3.18	9	9	.0	.0	6.4	sw.	23	nw.	6	10	16	5	5.3	73
SOUTH ATLANTIC									80.5	+1.6								76	5.09	−.7														6.0	
Asheville	2,253	77	92	944.1	1,016.3	−.3	86	65	75.4	+3.7	97	4	55	2	34	0	65	80	4.10	−.2	1.70	14	10	.0	.0	6.2	nw.	20	nw.	19	9	11	11	6.0	62
Charlotte [4]	779	63	86	988.5	1,015.9	−.4	91	71	81.1	+2.7	98	6	64	2	25	0	68	69	1.54	−3.6	.75	10	4	.0	.0	6.6	sw.	17	sw.	14	5	15	11	6.3	65
Greensboro [2]	886	6	56	985.1	1,016.6	+.3	89	68	78.5	+1.3	97	6	59	2	33	0	67	72	2.22	−2.9	.79	8	10	.0	.0	6.9	sw.	29	w.	21	6	14	11	6.0	63
Hatteras	11	5	47	1,015.9	1,016.3	.0	84	76	79.9	+1.7	88	21	69	3	14	0	72	79	3.85	−1.6	1.09	10	11	.0	.0	13.6	sw.	34	sw.	29	3	16	12	6.5	69
Raleigh [4]	376	5	71	1,002.7	1,015.9	.0	91	70	80.8	+2.0	98	6	60	9	30	0	68	74	5.86	+.5	1.75	13	11	.0	.0	6.9	sw.	26	nw.	23	3	23	5	5.6	60
Wilmington	72	73	107	1,015.6	1,016.9	+.3	88	74	80.7	+1.6	92	7	69	8	19	0	73	80	5.05	−2.1	2.17	16	18	.0	.0	10.0	sw.	29	sw.	19	8	14	9	5.6	68
Charleston [4]	48	11	92	1,014.9	1,016.6	.0	88	76	82.0	+.6	97	7	71	9	25	0	73	82	10.30	+3.4	2.83	15	11	.0	.0	9.7	s.	31	nw.	1	7	15	9	5.7	67
Columbia, S. C.	347	70	91	1,003.7	1,015.9	−.7	92	73	82.6	+1.7	100	4	70	9	28	0	70	71	1.16	−4.2	.49	8	10	.0	.0	8.3	s.	27	sw.	19	8	11	12	5.7	65
Greenville, S. C. [2]	1,040	18	36	979.3	1,015.6	−.3	88	70	79.1	+2.2	97	5	65	9	28	0	68	73	2.90	−2.5	1.27	11	10	.0	.0	7.0	sw.	30	n.	5	8	11	12	6.0	62
Augusta [4]	182	62	77	1,009.5	1,015.9	.0	92	73	82.6	+1.3	101	4	69	25	28	0	70	71	4.04	−1.4	1.64	8	12	.0	.0	5.7	s.	28	s.	28	7	13	11	5.9	68
Savannah [2]	65	19	51	1,014.6	1,016.9	+.3	90	73	81.6	+.7	96	7	70	4	24	0	72	78	11.33	+4.7	5.36	15	17	.0	.0	9.0	sw.	41	w.	24	5	15	11	6.4	72
Jacksonville [4]	43	86	110	1,015.6	1,017.3	.0	90	74	82.0	−.1	94	1	69	1	25	0	72	77	8.68	+2.0	2.26	20	22	.0	.0	7.1	sw.	28	s.	24	0	21	10	6.7	50
FLORIDA PENINSULA									82.4	+.3								78	6.08	+.5														6.7	
Key West [4]	21	10	64	1,015.9	1,016.6	−.3	90	79	84.0	+.5	91	7	72	5	16	0	74	74	5.61	+2.3	2.52	20	7	.0	.0	8.1	e.	25	sw.	18	2	20	9	6.1	49
Miami [4]	25	242	249	1,015.9	1,016.6	−1.0	86	77	81.3	−.5	89	18	70	14	15	0	74	80	4.30	−1.3	1.27	14	14	.0	.0	11.4	se.	40	se.	13	2	17	12	6.7	65
Tampa [2]	35	5	36	1,015.9	1,017.3	.0	90	73	82.0	+.8	95	16	70	6	23	0	72	79	8.33	+.4	2.15	18	27	.0	.0	6.4	e.	34	s.	31	0	15	16	7.3	59
EAST GULF									81.9	+1.0								77	7.13	+1.6														6.2	
Atlanta [2]	1,173	33	72	975.3	1,015.2	−1.4	90	70	80.0	+.9	99	5	63	25	29	0	68	73	11.26	+6.4	5.44	10	7	.0	.0	8.0	sw.	27	s.	10	7	15	9	5.7	67
Macon [4]	370	79	87	1,002.7	1,015.9	−.7	90	72	80.9	−.3	99	7	66	26	30	0	70	75	6.68	+1.9	2.82	14	19	.0	.0	5.7	s.	26	sw.	7	6	12	13	6.5	68
Thomasville	273	48	----	1,008.1	1,018.0	+1.1	90	72	80.9	−.9	96	19	68	25	24	0	--	--	8.15	+1.4	2.13	16	15	.0	.0	----	--	--	----	--	0	22	9	----	--
Apalachicola	35	11	51	1,015.2	1,016.6	.0	87	74	80.8	−.9	93	24	70	3	21	0	74	84	13.41	+5.7	3.10	23	18	.0	.0	6.6	sw.	36	s.	9	5	11	15	6.5	47
Pensacola [4]	56	54	79	1,013.9	1,015.6	−1.0	89	75	82.2	+1.2	98	24	71	1	26	0	74	80	15.59	+8.8	7.85	16	19	.0	.0	6.7	w.	32	se.	9	4	16	11	6.4	72
Anniston	618	6	32	997.0	1,015.9	−.7	90	68	79.2	+.7	99	5	61	25	34	0	70	79	8.32	+3.1	2.54	14	15	.0	.0	----	--	--	----	--	--	--	--	--	--
Birmingham [2]	700	5	63	990.9	1,015.6	−1.0	91	70	81.0	+1.3	100	5	64	25	30	0	69	72	6.55	+1.4	1.54	14	13	.0	.0	6.7	s.	35	ne.	9	3	15	13	6.5	49
Mobile [4]	57	86	161	1,013.9	1,015.9	−.4	92	76	83.7	+2.3	97	24	69	1	22	0	73	80	2.84	−4.0	.76	15	16	.0	.0	6.7	s.	26	nw.	24	1	22	8	6.6	55
Montgomery [4]	218	92	105	1,007.5	1,015.2	−1.4	91	74	82.4	+.7	98	7	70	10	25	0	72	76	5.22	+.4	3.44	9	10	.0	.0	6.4	s.	25	nw.	14	9	12	10	5.4	72
Meridian [4]	375	67	92	1,002.0	1,015.2	−.7	93	72	82.5	+2.1	99	6	68	24	27	0	71	75	4.04	−.8	.99	9	15	.0	.0	5.3	sw.	23	e.	5	5	20	6	5.5	74
Vicksburg [4]	247	82	102	1,006.1	1,014.9	−1.4	93	74	83.6	+2.3	97	25	68	2	24	0	72	75	1.54	−3.0	1.17	5	13	.0	.0	6.7	w.	27	w.	5	8	14	9	5.3	69
New Orleans C. O.	53	76	84	1,013.9	1,015.9	−.4	93	76	84.5	+2.1	98	24	71	25	24	0	74	77	4.63	−1.7	2.78	14	19	.0	.0	5.1	sw.	23	n.	25	1	17	13	7.0	64
New Orleans A. P. [2]	30	6	52	1,013.5	1,015.2	----	92	74	83.0	----	97	31	71	1	26	0	74	81	4.48	----	----	15	21	.0	.0	----	s.	--	----	--	1	19	11	6.3	--
WEST GULF									84.7	+1.5								73	1.79	−1.4														5.5	
Shreveport [2]	181	5	64	1,005.4	1,014.2	−1.0	96	75	85.3	+2.4	101	25	69	10	27	0	72	72	2.58	−1.0	1.73	7	6	.0	.0	7.8	sw.	34	s.	10	9	10	12	5.7	83
Fort Smith [2]	463	6	30	997.6	1,013.5	−.7	92	71	81.4	−.1	99	25	62	1	27	0	70	74	1.62	−1.8	.43	13	15	.0	.0	6.3	ne.	33	e.	7	4	12	15	6.7	72
Little Rock [2]	265	26	58	1,002.0	1,014.6	−.6	92	72	82.0	+1.1	98	25	63	2	26	0	71	76	3.41	−.1	1.88	13	15	.0	.0	6.7	sw.	31	nw.	13	6	15	10	6.1	63
Austin [2]	621	5	41	992.7	1,013.5	−1.1	96	74	84.8	+.9	101	31	68	1	28	0	70	70	2.29	.0	1.77	4	5	.0	.0	9.1	s.	36	s.	8	12	12	7	5.1	75
Brownsville [2]	20	5	54	1,010.5	1,012.5	−1.4	93	76	84.5	+.9	97	31	73	7	20	0	74	79	3.02	+.8	1.25	9	8	.0	.0	11.1	se.	26	s.	27	12	10	9	5.3	79
Corpus Christi [2]	44	6	33	1,013.2	1,013.9	−1.0	94	76	85.2	+3.6	97	31	69	1	22	0	76	81	1.03	----	.72	3	3	.0	.0	12.8	s.	33	s.	20	16	10	5	4.5	86
Dallas [2]	488	34	45	995.6	1,013.5	−1.1	95	76	85.7	+1.5	101	26	69	1	26	0	70	68	1.75	−1.1	.66	10	6	.0	.0	9.4	s.	29	s.	3	11	11	9	5.1	83
Fort Worth [2]	706	40	56	989.8	1,013.2	−1.0	95	75	84.8	+1.2	101	26	69	1	28	0	69	66	1.93	−.7	.86	10	9	.0	.0	10.3	s.	29	e.	27	12	12	7	4.9	84
Galveston [4]	54	122	129	1,013.2	1,014.9	−1.0	88	81	84.6	+1.2	92	7	74	11	13	0	76	78	.38	−3.3	.23	6	8	.0	.0	11.9	s.	27	s.	21	10	18	3	4.9	79
Houston [4]	138	157	190	1,009.8	1,014.2	−1.4	93	76	84.7	+1.0	99	31	69	1	26	0	74	80	2.13	−1.9	.66	8	13	.0	.0	8.2	s.	42	se.	8	3	19	9	6.1	67
Laredo [2]	418	10	38	997.0	1,011.2	----	100	77	88.6	+1.3	105	28	72	1	32	0	68	60	.66	−1.0	.44	7	7	.0	.0	----	se.	--	----	--	11	15	5	4.9	--
Palestine	510	64	72	997.0	1,014.6	+.4	93	74	83.9	+1.7	97	28	71	4	23	0	71	72	.92	−1.8	.42	8	7	.0	.0	6.6	s.	29	se.	8	10	11	5	5.5	74
Port Arthur [4]	34	59	134	1,013.5	1,014.9	−1.0	92	78	84.8	+2.0	98	8	70	31	27	0	74	81	1.01	−5.9	.52	8	16	.0	.0	10.7	s.	38	n.	31	5	18	8	5.7	75
San Antonio [2]	794	6	51	989.2	1,013.2	−1.0	96	74	85.4	+1.6	103	31	69	2	29	0	70	70	2.35	+.2	1.70	6	8	.0	.0	8.5	s.	34	sw.	11	7	14	10	6.0	66

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS FOR JULY 1948.—Continued

District and station	Elevation of instruments: Barometer above sea level [1]	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Averages: Mean maximum	Mean minimum	Mean	Departure from normal	Temperature of the air: Extremes: Highest	Date	Lowest	Date	Greatest daily range	Total heating degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Departure from normal	Greatest in 24 hours	Days with 0.01 inch or more	Days with thunderstorms	Total snowfall (unmelted)	Snow, sleet, and ice on ground at end of month	Wind: Average hourly speed	Prevailing direction	Maximum velocity: Miles per hour	Direction	Date	Character of day (sunrise to sunset), number of days: Clear	Partly cloudy	Cloudy	Average cloudiness, tenths (sunrise to sunset)	Possible sunshine
OHIO VALLEY AND TENNESSEE	*Ft.*	*Ft.*	*Ft.*	*Mb.*	*Mb.*	*Mb.*	°F.	°F.	°F.	°F.	°F.		°F.		°F.		°F.	%	*In.*	*In.*	*In.*			*In.*	*In.*	*m. p. h.*					*0–3*	*4–7*	*8–10*	*0–10*	%
									76.9	+1.1									4.40	+.7															6.2	
Chattanooga [2]	762	6	66	988.5	1,015.2	−1.4	91	69	80.0	+2.6	101	5	58	25	35	0	68	73	4.97	+.7	1.63	8	12	.0	.0	6.4	s.	22	nw.	22	7	11	13	6.1	56
Knoxville [2]	995	27	71	980.7	1,015.6	−.7	89	69	79.2	+2.5	99	5	59	25	31	0	61	72	5.91	+1.6	1.84	10	8	.0	.0	7.2	sw.	36	sw.	27	6	15	10	5.9	55
Memphis [4]	399	5	49	1,000.4	1,014.2	−1.4	92	72	82.0	+2.1	98	7	65	2	30	0	70	72	2.39	−.8	.70	7	10	.0	.0	7.2	sw.	31	sw.	26	7	15	9	5.5	83
Nashville [2]	546	5	72	995.6	1,014.9	−1.4	92	70	80.8	+1.7	101	4	57	2	37	0	68	70	1.65	−2.2	.59	11	10	.0	.0	7.4	sw.	52	nw.	22	8	13	10	5.6	61
Lexington [2]	989	4	58	980.7	1,015.9	−.4	87	66	76.6	+.7	96	5	56	25	29	0	66	75	3.57	−.1	.81	15	8	.0	.0	----	s.	--	----	--	5	15	11	6.2	--
Louisville [2]	525	5	54	998.0	1,014.6	−1.3	89	67	78.0	+.4	98	4	55	2	38	0	66	71	3.74	.0	1.11	13	12	.0	.0	6.1	s.	31	sw.	17	3	17	11	6.6	70
Evansville [2]	431	6	40	999.3	1,014.6	−1.0	88	67	77.4	+.9	95	4	52	2	37	0	67	75	5.10	+1.7	1.68	15	12	.0	.0	6.3	sw.	29	sw.	17	5	13	13	6.3	73
Indianapolis [2]	823	5	54	985.4	1,014.6	−.3	85	64	74.5	+.2	94	6	54	1	29	0	65	75	3.36	----	1.43	13	8	.0	.0	7.8	sw.	27	w.	22	7	8	16	6.2	68
Terre Haute [2]	575	4	36	994.2	1,015.2	.0	87	64	75.6	−1.0	92	11	51	1	31	1	67	75	3.54	+.4	.95	15	15	.0	.0	6.7	s.	31	sw.	4	6	13	12	6.1	61
Cincinnati [4]	627	135	148	984.1	1,015.2	−.7	89	69	78.7	+3.6	97	4	58	2	33	0	65	74	3.51	+.2	.96	9	6	.0	.0	3.9	w.	16	nw.	6	7	15	9	5.7	67
Columbus [4]	822	90	110	985.4	1,014.6	−1.0	87	67	77.0	+2.1	94	5	58	1	28	0	64	72	5.25	+1.7	1.88	10	7	.0	.0	7.9	s.	25	s.	17	12	9	10	5.2	69
Dayton [2]	1,003	6	55	979.3	1,014.9	−.3	85	65	74.6	−.3	93	4	54	1	29	1	64	72	5.39	+2.1	1.50	12	9	.0	.0	8.6	w.	38	sw.	4	8	12	11	5.8	70
Elkins [2]	1,947	5	45	948.5	1,016.3	−.3	81	58	69.6	−.2	88	5	45	2	35	10	64	86	8.33	+3.0	1.86	19	14	.0	.0	5.1	s.	34	sw.	22	1	11	19	7.7	64
Parkersburg	637	77	84	----	----	----	86	66	75.9	+.5	94	4	53	2	32	0	66	81	6.46	+2.2	2.84	14	10	.0	.0	5.6	sw.	21	sw.	5	3	15	13	6.6	57
Pittsburgh [2]	842	39	54	984.8	1,014.9	−.7	84	64	73.8	+.8	91	4	54	8	26	0	62	73	2.83	−1.2	1.22	13	11	.0	.0	8.7	s.	35	nw.	27	4	11	16	6.8	48
LOWER LAKES																																	5.3	
									72.8	+1.9								70	3.10	−.2															
Buffalo [2]	768	34	96	986.5	1,014.2	−.7	82	62	72.0	+2.0	92	12	50	2	36	4	61	70	2.58	−.4	1.38	7	5	.0	.0	12.0	sw.	43	sw.	30	9	14	8	5.5	78
Canton	448	10	61	996.3	1,011.9	−1.6	81	60	70.1	+1.5	88	12	48	15	34	5	58	66	3.04	−.5	1.76	10	8	.0	.0	7.8	w.	23	w.	31	8	14	9	5.6	68
Oswego	335	71	85	1,001.0	1,013.2	−1.0	79	63	71.0	+1.8	88	10	56	8	26	1	60	71	2.56	−.4	1.00	8	6	.0	.0	7.2	s.	23	n.	6	11	10	10	5.0	71
Rochester [2]	523	4	69	994.9	1,013.9	−1.0	84	61	72.2	+1.5	93	12	50	2	35	1	60	68	2.36	−.6	.63	10	5	.0	.0	8.7	sw.	31	w.	30	11	12	8	5.0	78
Syracuse [2]	596	5	57	992.6	1,013.5	−1.4	84	60	71.9	+2.6	94	12	50	15	37	1	61	70	2.05	−1.6	1.01	10	6	.0	.0	8.2	sw.	29	nw.	27	6	15	10	5.9	63
Erie [4]	714	57	81	988.8	1,014.6	.0	80	66	73.0	+2.0	90	30	56	2	21	3	62	74	4.22	+1.2	1.49	11	11	.0	.0	7.0	w.	20	w.	30	13	10	8	4.6	54
Cleveland [2]	762	27	54	987.1	1,013.9	−.3	85	64	74.4	+2.5	94	4	54	2	31	2	62	69	3.73	+.3	2.28	9	6	.0	.0	8.5	s.	32	w.	20	9	11	11	5.4	64
Sandusky	629	5	67	991.5	1,014.2	−1.4	84	66	75.0	+1.6	92	17	56	24	27	0	----	--	3.46	.0	1.63	9	6	.0	.0	7.7	sw.	27	sw.	27	14	12	5	4.6	70
Toledo [2]	628	5	47	991.5	1,014.2	−1.4	84	63	73.6	+1.8	92	11	53	1	30	1	64	72	2.72	−.3	.90	9	5	.0	.0	8.7	sw.	29	w.	30	7	13	11	5.7	69
Fort Wayne [2]	857	5	34	983.7	1,014.2	−1.4	84	63	73.6	+1.2	92	10	50	8	35	2	63	71	5.14	+1.5	2.41	10	8	.0	.0	6.9	sw.	36	se.	13	8	14	9	5.5	75
Detroit [2]	730	5	77	988.5	1,014.2	−1.4	84	64	73.7	+2.7	93	4	55	8	28	0	61	67	2.27	−1.0	.76	9	5	.0	.0	8.3	w.	27	s.	11	7	16	8	5.5	67
UPPER LAKES																																	5.3	
									69.8	+1.9								70	2.39	−.7															
Alpena	609	5	89	991.5	1,013.9	−1.3	77	59	68.0	+2.1	91	5	52	1	30	23	57	71	1.60	−1.2	.38	10	6	.0	.0	9.3	se.	26	se.	22	10	16	5	4.9	72
Escanaba	612	51	72	990.9	1,012.9	−2.0	75	59	67.0	+1.0	96	5	43	1	30	30	58	73	3.31	.0	.94	12	6	.0	.0	9.6	s.	31	s.	30	11	13	7	5.0	73
Grand Rapids [4]	707	70	244	989.2	1,013.9	−2.0	84	64	74.0	+1.7	96	11	51	1	28	4	59	66	2.07	−.8	.77	9	7	.0	.0	9.8	sw.	34	sw.	30	10	12	9	4.9	78
Lansing [4]	878	5	90	982.7	1,013.9	−1.3	84	61	72.2	+.6	92	11	48	1	32	8	60	67	1.65	−1.4	.64	9	7	.0	.0	7.9	w.	29	w.	30	8	14	9	5.3	78
Marquette	734	44	73	986.1	1,012.9	−2.0	76	58	67.2	+2.3	96	9	49	1	31	53	55	68	2.14	−1.0	.89	9	5	.0	.0	7.9	w.	28	w.	30	6	17	8	5.5	66
Sault Sainte Marie [2]	614	10	52	990.9	1,013.2	−1.7	77	53	65.0	+2.3	90	10	43	1	35	60	56	75	2.09	−.6	.74	9	6	.0	.0	9.8	w.	41	nw.	30	8	13	10	5.8	67
Chicago [2]	673	5	38	989.8	1,013.9	−1.7	85	65	74.8	+2.1	93	3	53	1	30	1	62	67	3.18	−.2	1.07	8	6	.0	.0	7.7	sw.	25	s.	25	8	11	12	5.7	70
Green Bay	617	5	32	990.9	1,013.5	−1.1	82	60	71.3	+1.3	94	5	45	1	33	5	58	66	2.35	−1.1	.58	10	9	.0	.0	7.7	se.	24	sw.	30	9	14	8	5.2	76
Milwaukee [2]	681	33	66	989.2	1,013.5	−1.7	82	62	72.2	+4.0	92	3	50	1	32	4	61	69	2.16	−.7	1.26	9	4	.0	.0	10.9	sw.	33	sw.	30	11	11	9	5.1	61
Duluth [4]	1,133	5	47	962.1	1,012.9	−1.7	75	56	65.8	+1.9	94	5	45	1	26	61	56	74	3.38	−.4	.93	13	6	.0	.0	11.1	ne.	34	w.	30	11	13	7	5.2	64
NORTH DAKOTA																																	5.3	
									70.2	+1.8								67	3.37	+.8															
Fargo [2]	940	5	47	977.0	1,010.5	−3.0	83	60	71.2	+3.1	101	6	50	23	32	8	60	70	4.10	+.7	1.59	9	7	.0	.0	11.6	s.	48	nw.	29	6	16	9	5.8	60
Bismarck [2]	1,677	5	41	951.9	1,011.2	−2.3	84	59	71.6	+2.2	104	6	47	27	38	9	58	68	2.35	+.1	1.42	8	8	.0	.0	9.9	nw.	40	nw.	29	10	13	8	5.1	66
Devils Lake	1,478	11	44	958.7	1,011.2	−2.3	80	58	68.8	+1.4	98	7	49	18	32	37	58	67	2.67	+.1	1.10	10	6	.0	.0	8.2	se.	26	nw.	26	12	10	9	5.1	68
Williston	1,878	42	50	944.8	1,010.2	−2.3	81	58	69.4	+.5	99	5	49	27	43	18	54	62	4.37	+2.5	1.28	10	10	.0	.0	7.4	w.	44	w.	24	13	9	9	5.2	84
UPPER MISSISSIPPI																																	5.4	
									75.9	+1.2								70	4.44	+.9															
Minneapolis-St. Paul [2]	919	43	74	979.0	1,011.5	−2.4	86	64	75.2	+2.9	101	6	51	23	32	5	61	64	1.34	−2.4	.49	6	7	.0	.0	10.7	se.	36	w.	20	12	12	7	4.8	69
La Crosse [2]	672	5	29	986.8	1,012.5	−1.4	86	62	73.6	+1.8	95	2	44	1	36	6	62	67	.84	−3.1	.51	8	6	.0	.0	8.2	s.	26	nw.	29	13	10	8	4.9	76
Madison [2]	974	27	39	979.3	1,013.5	−1.7	86	61	73.8	+1.7	97	11	45	1	36	3	60	64	2.55	−1.3	1.76	7	7	.0	.0	9.5	w.	33	w.	30	11	11	9	5.1	75
Charles City	1,015	10	51	977.7	1,013.5	−1.4	86	63	74.2	+1.9	100	6	51	23	32	1	----	--	1.44	−2.3	.67	8	6	.0	.0	5.7	s.	21	s.	1	14	9	8	4.4	68
Moline [2]	606	6	50	992.2	1,014.2	−1.0	86	64	75.1	+1.6	98	6	49	1	34	0	64	71	8.27	+4.9	3.45	12	10	.0	.0	7.3	sw.	35	w.	22	9	9	13	5.7	71
Des Moines [4]	860	5	99	----	1,013.9	−.3	88	66	77.0	+1.6	100	6	54	23	29	0	65	72	5.35	+1.8	1.68	9	10	.0	.0	7.6	se.	27	nw.	26	9	9	13	5.8	71
Dubuque	699	60	79	988.5	1,013.2	−1.7	86	66	75.9	+1.8	97	6	52	1	30	0	63	68	2.20	−1.7	1.09	6	7	.0	.0	4.9	nw.	17	se.	29	11	9	11	5.2	85
Burlington [2]	702	4	36	989.2	1,014.2	−1.0	86	64	75.4	−.4	97	6	52	1	32	0	66	76	7.63	+4.1	3.30	12	13	.0	.0	7.3	s.	42	nw.	21	8	8	15	6.0	72
Cairo	357	5	99	1,002.0	1,014.6	−.6	90	71	80.8	+.2	95	4	62	2	28	0	----	--	3.77	+.7	.98	10	12	.0	.0	6.3	sw.	26	sw.	27	12	7	15	5.8	80
Peoria [2]	609	7	26	992.6	1,014.6	−1.3	85	65	74.8	−.4	95	6	52	1	29	0	65	74	8.18	+4.6	3.19	11	11	.0	.0	7.1	sw.	26	w.	21	8	9	14	5.9	65
Springfield, Ill. [4]	636	5	191	992.6	1,014.2	−.7	86	66	75.7	+1.7	94	6	53	1	30	1	66	76	4.42	+1.6	1.51	11	10	.0	.0	8.1	s.	50	nw.	25	7	11	13	6.0	70
St. Louis [4]	568	33	59	994.2	1,014.2	−1.4	88	71	79.2	+.4	94	6	62	23	24	0	----	72	7.30	+4.3	3.50	12	11	.0	.0	8.6	s.	36	nw.	19	10	11	10	----	71
MISSOURI VALLEY																																	5.2	
									77.2	+1.5								71	4.60	+.9															
Columbia, Mo. [4]	784	6	66	986.1	1,013.9	−1.0	87	69	78.1	+.8	96	6	56	24	26	0	68	78	6.35	+2.9	2.43	12	14	.0	.0	5.5	s.	23	w.	22	10	13	8	5.4	56
Kansas City [2]	963	38	76	980.0	1,013.9	−.3	89	70	79.5	+1.4	98	7	58	23	25	0	67	71	7.29	+3.5	1.38	12	11	.0	.0	9.3	sw.	34	nw.	21	7	14	10	6.0	66
St. Joseph [2]	967	5	51	1,008.1	1,013.2	−.7	88	68	78.4	+1.0	96	8	56	23	27	0	68	76	6.82	+3.0	3.13	14	15	.0	.0	6.5	s.	38	nw.	29	9	11	11	5.5	54
Springfield, Mo. [2]	1,324	5	50	968.2	1,014.6	−1.0	86	67	76.2	.0	92	25	58	1	25	0	68	80	5.08	+.9	1.56	12	16	.0	.0	9.2	s.	40	w.	16	7	13	11	6.0	74
Topeka [4]	987	65	87	978.3	1,013.2	−.7	90	69	79.6	+1.8	99	7	58	23	28	0	68	76	5.81	+1.5	1.90	13	13	.0	.0	7.1	s.	24	n.	19	8	11	12	5.9	74
Lincoln [4]	1,189	6	81	970.9	1,012.9	−.6	89	67	78.2	+1.7	98	5	52	23	32	0	64	68	2.50	−1.4	1.43	3	6	.0	.0	8.0	s.	25	s.	1	11	13	7	5.0	79
Norfolk, Nebr. [2]	1,551	5	38	958.3	1,012.9	-----	88	64	75.8	+.1	99	1	49	23	33	2	62	66	4.02	+.6	2.19	8	8	.0	.0	----	s.	--	----	--	1	15	10	6	4.3	--
Omaha [2]	1,105	5	68	973.9	1,012.9	−1.0	89	67	78.1	+2.9	99	6	54	23	31	0	64	68	5.91	+2.4	3.22	9	9	.0	.0	9.7	s.	34	sw.	1	10	13	8	5.3	74
Valentine	2,598	46	54	922.5	1,012.2	−2.0	88	62	74.8	+1.1	102	1	51	30	37	4	56	59	1.89	−1.1	.49	7	10	.0	.0	8.7	s.	31	sw.	28	16	10	5	3.9	85
Sioux City [2]	1,138	5	40	972.2	1,011.2	−2.7	89	64	76.3	+3.0	100	6	50	23	36	1	62	70	3.19	−.4	1.57	8	6	.0	.0	9.1	s.	31	sw.	1	12	10	9	5.0	--
Huron [2]	1,301	5	41	965.5	1,011.2	−2.7	86	62	74.1	+2.3	99	5	51	23	36	1	62	72	1.69	−1.5	.52	10	8	.0	.0	11.7	se.	34	s.	29	13	10	8	5.0	76

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS FOR JULY 1948.—Continued

District and station	Elevation of instruments: Barometer above sea level [1]	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Averages: Mean maximum	Temperature of the air: Averages: Mean minimum	Temperature of the air: Averages: Mean	Temperature of the air: Averages: Departure from normal	Temperature of the air: Extremes: Highest	Temperature of the air: Extremes: Date	Temperature of the air: Extremes: Lowest	Temperature of the air: Extremes: Date	Temperature of the air: Extremes: Greatest daily range	Total heating degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Precipitation: Departure from normal	Precipitation: Greatest in 24 hours	Precipitation: Days with 0.01 inch or more	Precipitation: Days with thunderstorms	Precipitation: Total snowfall (unmelted)	Precipitation: Snow, sleet, and ice on ground at end of month	Wind: Average hourly speed	Wind: Prevailing direction	Wind: Maximum velocity: Miles per hour	Wind: Maximum velocity: Direction	Wind: Maximum velocity: Date	Character of day (sunrise to sunset), number of days: Clear	Character of day (sunrise to sunset), number of days: Partly cloudy	Character of day (sunrise to sunset), number of days: Cloudy	Average cloudiness, tenths (sunrise to sunset)	Possible sunshine
NORTHERN SLOPE	Ft.	Ft.	Ft.	Mb.	Mb.	Mb.	°F.	°F.	°F.	°F.	°F.		°F.		°F.		°F.	%	In.	In.	In.			In.	In.	m. p.h.					0–3	4–7	8–10	0–10	%
Billings [2]	3,570	16	39	890.3	1,011.5	−2.7	84	57	70.4	−1.6	99	5	46	29	41	10	48	50	2.36	+.8	.95	11	11	.0	.0	9.9	sw.	61	nw.	1	13	15	3	4.2	80
Butte	5,533	44	58	831.0	1,015.9	-----	74	43	58.5	−5.4	87	22	34	25	46	209	43	62	2.44	+1.1	.44	15	13	.0	.0	----	s.	--	------	--	9	13	9	5.2	--
Glasgow	2,086	34	53	938.4	1,011.2	-----	85	57	71.0	−.2	105	6	46	30	43	7	52	56	2.23	+.8	.53	14	9	.0	.0	----	nw.	--	------	--	12	11	8	5.0	--
Great Falls [3]	3,657	16	75	888.3	1,012.9	-----	78	54	66.4	−2.8	94	27	46	28	46	39	46	54	2.28	+.8	.83	10	8	.0	.0	11.4	sw.	63	sw.	23	9	17	5	4.8	77
Havre	2,507	11	67	924.8	1,012.5	−.7	83	56	69.3	+1.0	100	5	44	29	40	16	47	52	1.99	+.1	.87	11	9	.0	.0	8.4	w.	40	nw.	27	12	12	7	4.7	82
Helena [3]	4,124	5	43	874.0	1,013.9	.0	78	50	64.0	−1.7	89	27	43	28	41	60	47	60	1.85	+.7	.60	13	13	.0	.0	8.1	w.	43	sw.	1	9	16	6	4.9	75
Missoula [3]	3,263	4	32	901.5	1,014.2	−.7	78	48	63.5	−3.3	95	22	42	13	43	72	48	62	1.50	+.7	.75	7	8	.0	.0	6.6	nw.	35	nw.	1	8	17	6	5.3	67
Kalispell	2,973	48	56	911.3	1,012.9	−.3	74	50	61.8	−2.3	85	22	42	8	35	112	49	66	3.15	+2.0	1.08	12	11	.0	.0	5.6	w.	26	sw.	23	10	14	7	5.2	79
Miles City [3]	2,371	5	28	929.2	1,011.5	−1.7	85	58	71.6	-----	103	6	44	19	45	7	54	58	4.58	-----	2.12	14	14	.0	.0	----	nw.	--	------	--	13	11	7	4.4	--
Rapid City [3]	3,259	5	56	900.8	1,011.9	−2.3	84	57	70.8	−.2	98	5	49	30	35	6	55	63	2.65	+.6	.67	7	12	.0	.0	11.8	nw.	56	nw.	24	11	15	5	4.6	76
Cheyenne [3]	6,094	22	40	814.8	1,012.2	−2.0	82	53	67.8	+1.1	89	4	43	30	38	14	46	56	2.34	+.2	.98	10	17	.0	.0	9.5	w.	35	w.	25	8	21	2	5.1	62
Lander [3]	5,352	6	30	835.8	1,011.9	−1.6	85	55	70.0	+2.6	94	10	47	29	37	17	40	41	.99	+.3	.62	6	10	.0	.0	8.6	sw.	44	w.	6	17	14	0	3.2	80
Sheridan [3]	3,790	5	38	883.5	1,018.3	-----	83	54	68.8	+.4	100	5	47	17	44	22	52	60	2.98	+1.8	2.28	10	13	.0	.0	8.1	nw.	45	nw.	1	14	14	3	4.3	74
North Platte [4]	2,821	11	51	915.7	1,011.9	−2.0	87	62	74.9	+2.0	98	1	52	23	33	0	58	65	3.12	+.4	1.17	10	11	.0	.0	6.6	s.	34	sw.	28	13	15	3	4.5	80
MIDDLE SLOPE																																				
Denver [4]	5,292	106	113	839.1	1,011.5	−2.7	87	61	77.8	+.1	93	13	55	30	33	0	46	66	3.80	+.9	.88	4	11	.0	.0	7.7	s.	33	nw.	31	11	16	4	4.9	78
Pueblo [3]	4,690	5	36	857.1	1,011.5	−1.7	91	60	75.4	+1.2	97	8	54	1	40	0	52	54	.51	−1.4	.40	5	14	.0	.0	7.4	nw.	35	nw.	3	17	13	1	4.4	78
Concordia	1,392	50	58	964.1	1,012.5	−1.4	86	68	77.4	−.6	93	18	55	23	25	0	66	71	6.38	+2.6	3.32	9	10	.0	.0	7.5	s.	30	w.	19	16	12	3	3.5	83
Dodge City [3]	2,509	5	58	926.5	1,011.9	−1.6	90	65	77.4	−1.0	98	28	60	17	30	0	62	65	5.25	+2.1	1.90	12	13	.0	.0	14.7	se.	55	nw.	16	8	23	0	4.5	73
Wichita [3]	1,358	52	64	965.5	1,012.5	−1.0	88	68	78.2	−1.2	97	14	60	23	34	0	68	74	6.39	+3.0	1.85	15	15	.0	.0	12.7	s.	80	n.	14	7	16	8	5.7	67
Oklahoma City [4]	1,214	10	47	970.5	1,012.9	−1.0	91	72	81.6	+1.0	97	27	64	31	24	0	70	76	3.54	+.7	.80	11	10	.0	.0	7.9	s.	26	ne.	7	6	16	9	5.7	66
Tulsa [3]	674	10	60	989.5	1,013.2	-----	90	71	80.2	−.9	98	27	64	31	24	0	72	78	3.61	+.4	1.25	10	14	.0	.0	8.9	s.	42	se.	14	5	13	13	6.3	48
SOUTHERN SLOPE																																				
Abilene [3]	1,755	4	59	952.6	1,011.9	−1.3	96	73	82.0	+.5	103	26	65	1	30	0	66	62	2.54	+.1	1.65	10	8	.0	.0	13.0	s.	41	se.	4	10	11	10	5.1	69
Amarillo [3]	3,604	5	42	889.3	1,011.2	−2.7	92	65	78.8	+2.9	100	29	60	31	33	0	61	62	1.52	−1.3	.85	9	15	.0	.0	14.2	s.	59	sw.	16	8	20	3	5.4	71
Del Rio	960	63	71	978.7	1,011.2	−1.3	93	74	83.6	−2.7	100	26	65	10	31	0	68	66	6.19	+3.8	4.95	7	7	.0	.0	9.3	se.	40	n.	10	12	11	8	5.2	77
Roswell	3,614	6	29	891.0	1,010.5	−2.0	94	64	79.2	+.3	101	9	58	2	37	0	56	56	1.89	−.4	.88	6	16	.0	.0	8.0	se.	42	e.	10	9	18	4	4.7	77
Wichita Falls	1,030	4	49	976.3	1,011.5	-----	95	74	84.4	−1.2	102	29	66	5	26	0	68	66	1.47	−.9	.73	8	6	.0	.0	----	------	--	------	--	9	14	8	----	--
SOUTHERN PLATEAU																																				
El Paso [3]	3,916	35	85	884.9	1,008.8	−1.7	96	71	83.0	+1.5	105	9	66	2	31	0	54	38	1.01	−.6	.82	5	13	.0	.0	10.2	se.	42	nw.	10	17	10	4	3.7	84
Albuquerque [3]	5,314	5	45	838.8	1,009.1	−1.7	93	66	79.6	+2.9	100	13	61	3	33	0	46	42	.82	−1.2	.44	5	13	.0	.0	10.2	se.	42	nw.	10	17	10	4	3.7	84
Flagstaff	6,907	34	48	703.8	1,014.9	-----	84	49	66.7	+1.0	91	15	43	3	46	7	37	38	.46	−1.0	.29	6	8	.0	.0	8.7	se.	43	e.	10	17	10	4	3.9	80
Phoenix [4]	1,107	39	87	969.5	1,007.1	−1.0	105	78	91.1	+1.3	112	15	72	9	36	0	52	31	.73	−2.2	.33	6	7	.0	.0	----	w.	--	------	--	15	9	7	4.4	--
Tucson [3]	2,555	5	39	923.1	1,008.5	−.3	100	73	86.8	+.4	108	8	65	19	38	0	53	38	.79	−.3	.52	2	2	.0	.0	6.9	w.	23	e.	24	18	9	4	3.8	88
Yuma	142	9	54	1,002.0	1,006.8	−1.0	106	75	90.8	.0	113	15	66	4	41	0	56	38	3.02	+.8	1.87	5	5	.0	.0	6.7	nw.	36	nw.	19	15	6	10	4.6	79
MIDDLE PLATEAU																			.22	.0	.22	2	0	.0	.0	6.3	s.	21	se.	20	27	2	2	1.6	97
Ely [3]	6,262	8	41	809.7	1,011.9	-----	87	46	71.7	+1.0	92	10	30	29	55	35	30	33	.25	−.2	T	0	2	.0	.0	12.4	s.	40	s.	4	24	7	0	2.2	95
Reno [3]	4,527	20	52	861.5	1,012.2	−.3	90	46	66.2	+2.7	99	15	36	5	51	33	38	26	T	−.6	.00	0	0	.0	.0	8.3	s.	38	w.	4	28	3	0	2.1	93
Winnemucca	4,339	5	56	866.2	1,010.5	−2.0	91	53	67.8	−.3	99	15	43	3	46	10	38	38	.00	−.2	.00	0	0	.0	.0	7.4	sw.	36	sw.	1	26	5	0	1.5	93
Salt Lake City [3]	4,357	32	58	865.6	1,009.5	−2.4	91	60	71.9	+1.3	98	22	40	5	47	10	37	31	T	−.2	T	0	2	.0	.0	7.4	sw.	36	sw.	1	26	5	0	1.5	91
Grand Junction [3]	4,602	5	26	859.5	1,011.2	−1.7	93	61	75.7	+1.7	100	10	45	29	40	6	41	33	.39	−.1	.22	5	5	.0	.0	10.2	se.	35	sw.	19	24	6	1	2.5	84
NORTHERN PLATEAU																			.86	+.2	.62	7	10	.0	.0	9.6	se.	34	w.	24	19	9	3	3.5	--
Baker [4]	3,471	36	54	895.4	1,014.6	−.3	78	48	66.2	−2.4	95	22	40	2	42	95	47	52	.84	−.1	.70	10	8	.0	.0	6.0	n.	27	sw.	31	14	14	3	3.9	73
Meacham [3]	4,056	7	28	877.8	1,016.6	-----	72	46	63.4	−2.2	83	21	37	2	34	196	44	62	.70	+.1	.23	8	5	.0	.0	----	nw.	--	------	--	14	10	7	4.0	--
Boise [3]	2,739	5	49	917.7	1,011.5	−1.0	86	54	59.2	-----	99	22	45	28	39	8	43	60	1.36	-----	.43	8	5	.0	.0	----	nw.	--	------	--	14	10	7	4.2	--
Lewiston	1,436	4	23	962.8	1,013.5	-----	83	54	70.4	−2.1	99	22	45	28	39	8	43	42	.08	−.2	.06	2	2	.0	.0	9.4	nw.	38	nw.	27	17	12	2	3.1	88
Pocatello [3]	4,478	5	31	862.2	1,011.5	−.7	87	53	68.8	-----	94	17	46	8	37	19	48	53	2.05	-----	.87	5	2	.0	.0	----	e.	--	------	--	15	10	6	4.2	--
Ellensburg [3]	1,735	5	58	953.3	1,014.6	-----	80	51	70.0	−.2	95	10	46	4	45	8	39	35	.01	−.8	.01	1	3	.0	.0	9.5	sw.	35	sw.	27	22	8	1	2.7	86
Lacrosse	1,544	5	43	959.0	1,013.9	-----	82	49	65.3	−2.9	95	31	38	8	43	65	46	54	.49	+.2	.43	4	3	.0	.0	----	nw.	--	------	--	17	12	2	3.8	--
Spokane [3]	1,929	6	51	945.8	1,014.2	+.7	78	52	65.6	-----	94	17	40	2	46	55	48	58	1.52	-----	.67	9	4	.0	.0	----	sw.	--	------	--	13	13	5	4.4	--
Yakima [3]	1,076	4	54	976.0	1,014.2	+.3	86	50	65.1	−3.9	89	17	43	8	33	64	47	56	1.29	+.6	.54	7	2	.0	.0	7.0	sw.	26	sw.	27	11	13	7	4.9	87
									68.0	−3.4	98	31	40	8	45	34	48	52	.07	−.2	.05	3	3	.0	.0	----	nw.	--	------	--	17	11	3	3.8	--

See footnotes at end of table.

CLIMATOLOGICAL DATA FOR WEATHER BUREAU STATIONS FOR JULY 1948.—Continued

District and station	Elevation of instruments: Barometer above sea level [1]	Elevation of instruments: Thermometer above ground	Elevation of instruments: Anemometer above ground	Pressure: Station	Pressure: Sea level	Pressure: Departure from normal	Temperature of the air: Averages: Mean maximum	Mean minimum	Mean	Departure from normal	Temperature of the air: Extremes: Highest	Date	Lowest	Date	Greatest daily range	Total heating degree days	Mean temperature of the dew point	Mean relative humidity	Precipitation: Total	Departure from normal	Greatest in 24 hours	Days with 0.01 inch or more	Days with thunderstorms	Total snowfall (unmelted)	Snow, sleet, and ice on ground at end of month	Wind: Average hourly speed	Prevailing direction	Maximum velocity: Miles per hour	Direction	Date	Character of day (sunrise to sunset), number of days: Clear	Partly cloudy	Cloudy	Average cloudiness, tenths (sunrise to sunset)	Possible sunshine
NORTH PACIFIC	*Ft.*	*Ft.*	*Ft.*	*Mb.*	*Mb.*	*Mb.*	°F.	°F.	°F.	°F.	°F.		°F.		°F.		°F.	%	*In.*	*In.*	*In.*			*In.*	*In.*	*m. p.h.*					*0-3*	*4-7*	*8-10*	*0-10*	%
									63.6	−.7							.96	69	.96	+.4														5.2	
Kelso [3]	750	38	76	.....	.....	.....	75	50	62.6	.....	86	30	40	2	37	98	54	76	.74	.....	.39	7	1	.0	.0	.....	nw.	...	.....	...	...	10	8	13	6.1	...
North Head	211	5	55	1,010.5	1,018.0	−1.0	62	54	58.2	+1.0	66	11	51	1	12	210	54	87	.74	−.2	.33	10	0	.0	.0	13.8	nw.	34	s.	5	5	9	17	6.7	46
Seattle [4]	125	90	321	1,012.5	1,017.3	−.7	74	55	64.4	−1.1	86	31	49	2	28	52	53	72	1.81	+1.2	.53	9	0	.0	.0	7.2	s.	27	w.	26	10	6	15	6.0	45
Tacoma	194	172	201	1,010.2	1,016.9	−1.1	72	54	63.2	+.4	85	31	47	2	27	79	...	...	3.00	+2.4	1.06	9	3	.0	.0	7.3	n.	24	sw.	7	11	11	9	5.3	53
Tatoosh Island	86	5	61	1,014.6	1,017.6	−1.4	60	52	56.0	+.9	69	30	49	1	18	285	53	90	1.29	−.2	.43	12	0	.0	.0	9.2	s.	26	s.	10	3	6	22	7.5	39
Burns	4,162	35	47	873.0	1,013.5	.....	81	49	64.9	−1.7	94	31	35	6	40	80	40	43	.54	+.1	.31	4	3	.0	.0	.....	n.	...	.....	...	18	8	5	3.5	...
Eugene [2]	433	4	35	1,003.4	1,016.9	.....	80	50	64.8	.....	91	16	42	4	40	52	52	67	.49	.....	.37	3	0	.0	.0	.....	n.	...	.....	...	14	8	9	4.5	...
Medford [2]	1,329	29	58	967.8	1,014.9	+.7	84	52	68.4	−4.3	98	29	44	2	50	27	50	57	.38	+.1	.26	2	1	.0	.0	.....	nw.	...	.....	...	23	4	4	2.8	...
Portland, Oreg. [4]	154	68	106	1,011.9	1,017.6	+.3	77	57	66.8	+.1	92	31	48	2	28	32	53	66	.32	−.3	.18	6	0	.0	.0	6.0	nw.	20	w.	27	11	5	15	5.6	65
Roseburg	510	45	76	998.3	1,016.6	.0	80	53	66.6	−.8	92	30	47	7	37	36	51	62	.29	.0	.22	2	0	.0	.0	5.5	n.	20	n.	14	16	10	5	3.6	74
MIDDLE PACIFIC COAST																																		3.2	
									67.4	+.4								64	.12	+.1															
Eureka	60	72	88	1,015.2	1,017.6	−.4	61	52	56.4	+.9	67	9	47	2	16	266	52	85	.25	+.1	.22	3	0	.0	.0	6.9	nw.	27	n.	28	6	11	14	6.2	47
Red Bluff [3]	353	5	26	998.3	1,010.8	.....	95	66	80.2	−.6	110	15	54	4	39	3	48	36	.22	+.2	.22	2	2	.0	.0	7.5	se.	25	se.	4	27	3	1	1.7	96
Sacramento [4]	66	92	115	1,008.8	1,011.2	−.3	90	58	73.8	+.6	107	15	52	4	40	7	52	55	.00	.0	.00	0	0	.0	.0	8.2	s.	21	s.	4	28	2	1	.8	94
San Francisco [4]	155	112	132	1,008.1	1,013.9	−.3	65	54	59.3	+.8	83	14	51	19	27	180	52	78	.02	.0	.02	1	0	.0	.0	11.0	w.	27	w.	28	13	12	6	4.2	58
SOUTH PACIFIC COAST																																		2.6	
									72.7	−.6								61	T	.0															
Fresno [3]	327	5	34	998.6	1,009.8	−1.0	98	62	80.2	−1.1	110	16	52	5	41	0	51	41	.00	.0	.00	0	0	.0	.0	7.4	nw.	24	nw.	4	31	0	0	1.0	100
Los Angeles	338	236	263	1,000.3	1,012.5	−.7	82	60	71.0	+.8	90	10	55	7	32	0	56	66	T	.0	T	0	0	.0	.0	5.3	w.	17	w.	7	23	7	1	2.6	80
San Diego [3]	87	20	55	1,009.5	1,012.5	−.4	74	60	67.0	−1.5	80	9	55	5	23	2	57	75	T	.0	T	0	0	.0	.0	6.6	nw.	17	nw.	6	12	16	3	4.2	66
WEST INDIES																																			
San Juan, P. R.	82	9	54	1,013.2	1,015.9	.....	84	76	80.1	.0	86	6	72	11	12	0	75	84	10.92	+5.0	2.01	25	10	.0	.0	13.1	e.	33	e.	15	0	16	15	7.2	39
PANAMA CANAL																																			
Balboa Heights [5]	118	6	92	.....	1,010.0	.....	87	74	80.4	.....	93	18	72	3	19	0	....	89	6.39	.....	2.30	16	11	.0	.0	4.6	nw.	33	s.	2	0	8	23	....	33
Cristobal [5]	27	37	92	.....	1,010.4	.....	84	76	79.9	.....	90	14	72	27	15	0	....	87	15.82	.....	2.37	25	9	.0	.0	6.7	s.	23	sw.	21	0	7	24	....	14
ALASKA																																			
Anchorage [3]	132	6	44	1,007.8	1,012.5	.....	64	48	56.2	−.8	74	14	39	28	25	272	48	76	3.28	+1.6	1.06	20	0	.0	.0	6.0	s.	31	s.	23	2	4	25	8.5	...
Annette Island	113	5	53	1,013.2	1,017.3	.....	64	52	58.2	+.3	76	5	49	29	26	209	52	83	3.12	−2.4	1.30	11	0	.0	.0	.....	se.	...	.....	...	1	8	22	7.7	...
Barrow	29	5	27	1,008.8	1,008.8	.....	47	34	40.5	+.6	70	17	29	2	31	763	38	93	.88	.0	.56	12	0	1.2	.0	10.0	sw.	27	sw.	5	0	6	25	8.5	...
Bethel [3]	28	5	31	1,009.1	1,010.5	.....	57	46	51.4	+7.8	78	15	37	9	31	420	46	86	2.00	−.3	.44	21	1	.0	.0	10.4	sw.	...	.....	...	0	5	26	9.0	...
Cordova [3]	45	5	32	1,012.1	1,012.2	.....	60	45	52.6	−.7	67	4	39	21	28	386	50	90	9.69	+4.5	1.95	21	0	.0	.0	.....	e.	...	.....	...	2	8	21	8.1	...
Fairbanks [3]	455	5	63	992.9	1,009.8	.....	68	48	58.0	−2.0	83	17	41	29	35	223	50	75	4.24	+2.4	2.16	14	4	.0	.0	6.4	sw.	24	sw.	3	1	9	21	7.7	...
Galena	139	4	66	1,002.7	1,007.5	.....	62	50	55.8	−4.7	76	15	44	9	22	285	46	72	4.38	+1.5	2.34	16	0	.0	.0	.....	s.	30	se.	4	2	3	26	8.4	...
Gambell	32	5	32	1,005.4	1,006.4	.....	47	41	43.8	−1.5	57	17	36	29	12	657	42	93	2.55	+1.0	....	16	....	.0	.0	14.0	sw.	44	ne.	23	0	2	29	9.0	...
Juneau [3]	80	6	30	1,014.6	1,015.2	.....	66	48	56.9	+1.4	80	6	42	1	34	254	48	75	5.54	+1.3	.96	14	0	.0	.0	7.6	n.	23	se.	29	2	9	20	7.6	...
Kotzebue [3]	20	5	31	1,007.1	1,007.8	.....	56	46	51.0	−2.0	68	23	36	31	20	429	47	86	2.17	+.6	.54	19	0	.0	.0	12.2	se.	34	se.	4	0	2	29	8.8	...
McGrath [3]	341	5	31	998.0	1,010.5	.....	63	48	55.2	−3.4	79	15	37	30	28	308	47	76	3.35	+.9	.98	24	0	.0	.0	.....	s.	22	s.	7	0	4	27	8.6	...
Nome [3]	22	10	75	1,006.4	1,007.1	.....	52	42	46.8	−3.1	63	15	37	5	15	545	46	92	3.89	+1.4	.84	21	0	.0	.0	12.1	sw.	34	e.	4	1	1	29	8.8	...
Northway [3]	1,718	5	32	948.9	1,011.2	.....	70	48	59.4	+.1	83	17	42	31	34	179	46	66	1.91	−.6	.82	11	4	.0	.0	5.9	nw.	24	w.	21	1	10	20	7.5	...
HAWAII																																			
Honolulu [4]	38	86	98	1,015.6	1,016.9	.....	82	74	77.8	+.1	84	13	71	8	11	0	66	67	.71	−.5	.20	14	0	.0	.0	10.2	ne.	25	ne.	11	14	13	4	4.5	70

[1] Height of barometer cistern above mean sea level on January 1, 1900, or when station was first established since January 1, 1900. When station is moved to new location or airport, the pressure is reduced to the original elevation for homogeneity. These elevations do not represent the present station elevation in most cases.

[2] Data are from airport records. Pressures adjusted to original elevations according to note 1.

[3] Barometric, hygrometric, wind, character of day, and average cloudiness data from airport records; remainder from city office records.

[4] Barometric and hygrometric data from airport records; remainder from city office records.

[5] Barometric, temperature, degree day, and hygrometric data from airport; remainder from city office records.

[6] Bihourly hygrometric data.

NOTE.—Unless otherwise indicated, data in table are city office records.

SEVERE LOCAL STORMS FOR JULY 1948

[The table hereunder contains such data as have been received concerning severe local storms that occurred during the month. A revised list will appear in the United States Meteorological Yearbook]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
Harrison County, Ohio	1	Afternoon				Wind	Considerable damage to property, trees, and crops; 1 person injured.
Kittson County, Minn., northwestern part.	1	1:30 p. m.	[1] 1½		$50,000	Hail	Damaged growing crops and real property.
Rosholt, Wis.	1	10 p. m.			35,000	Electrical	High school building struck by lightning and burned.
New London, Wis., near	1	10:30 p. m.			2,100	do	Barn, silo, and 15 loads of hay destroyed by lightning fire.
Hortonville, Wis.	1	10:45 p. m.				do	Lightning damaged home "as if a bomb had hit it" and started damaging fire in garage.
Green Bay, Wis.	2	Early a. m.			50,000	do	Lightning struck power line leading into 2-story Fabry Glove and Mitten Co. building, starting fire in basement. Damage to building $15,000, to stock, $35,000.
Sarasota, Fla.	2	Afternoon			100,000	do	Fire started by lightning destroyed warehouse and 25 trailers.
Kittson County, Minn., northwestern part.	2	5 p. m.			20,000	Thunderstorm	Barns, outbuildings, and granaries moved from foundations or otherwise damaged; trees uprooted.
Harper County, Kans.	3	6 to 9 p. m.	[1] 4		50,000	Hail	8 miles east of Anthony in vicinities of Freeport and Bluff City. Chief damage to wheat; many fields completely destroyed.
Donegal, Pa.	3					Thunderstorm	Lightning struck and burned a barn. Crops damaged considerably.
Putnam, Tex.	4	10 a. m.	50	0	1,000	Tornado	
Louisville, Ky.	4	6 p. m.			12,000	Wind Squall	3 persons injured when 2 small planes overturned.
Elkins, W. Va.	4					Electrical	Water works pumping station struck by lightning.
Scranton, Pa., vicinity	5	Afternoon			10,000	Thunderstorm	High winds, lightning, and hail damaged trees, utility lines, crops, and buildings. Hail to depth of 1 inch.
Wilkes-Barre, Pa.	5	5:30–11:40 p. m.			250,000	Electrical	Lightning struck and fire burned a school building; also struck hotel roof, trolley wires, residence, and picnic pavilion, where 2 persons were slightly injured.
Jackson and Wood Counties, W. Va., portions of.	5	6–8 p. m.				Thunderstorm	Several farm homes and buildings damaged severely, and some damage to crops from wind and hail. Winds in excess of 45 m. p. h. at Parkersburg-Wood County Airport.
Southeastern Outagamie and northwestern Calumet Counties, Wis.	5	6:10–7 p. m.			12,000	do	Wind wrecked barn near Sherwood. Wind and hail broke plate glass and greenhouse windows at Little Chute and windows at Kaukauna; minor crop damage.
Chambersburg, Pa.	5	Evening		0	10,000	Tornado	Section of new wall damaged. Many shade trees and plantings at Wilson College campus twisted off.
Rhode Island, southern Connecticut, and eastern Massachusetts.	5–6	4 p. m.–4 a. m.			250,000	Thunderstorm	Greatest damage in Fall River, Mass., area, where lightning set fire to building containing a large stock of plumbing supplies; damage estimated at $200,000. A mill building also struck and fired; estimated damage, $10,000. Many small fires. Roofs, wires, and trees damaged throughout whole area; also streets and cellars flooded. Many small craft upset in Narragansett Bay. Hailstones, as large as marbles, caused minor damage in New Haven, Conn. Wind squalls notably severe in Fitchburg, Mass., region, where Telephone Company reported 400 lines and 1,300 stations out of commission.
Baltimore, Md.	6	4 a. m.				do	Strong winds toppled trees and tore off limbs, severing telephone and electric wires.
Middle Hope, N. Y.	6	2:30–2:45 p. m.	[1] 1		75,000	Wind and hail	Hailstones, ranging up to size of walnuts, cut currants, cherries, grapes, apples, and peaches, while hail and wind took some fruit from trees.
Lewellen, Nebr., 3 miles east	6	3 p. m.				Hail	90 percent loss of small grain and alfalfa.
Rhode Island, southern Connecticut, and eastern Massachusetts.	6	4–6 p. m.; 10 p. m.–midnight.		1	25,000	Thunderstorm	Storms strikingly similar to those of previous evening and night, both in locale and energy. Many buildings damaged by lightning, few seriously. Much flooding of cellars and streets by excessively heavy downpours. A yachtsman at Marblehead, Mass., swept overboard and drowned. Telephones and electric lights in many communities put out of service.
Randolph and Barbour Counties, W. Va., portions of.	6	Late afternoon.				do	Waterworks pumping station at Elkins struck by lightning. Much wind damage in vicinity of Junior, Belington, and Norton.
Fluvanna and Louisa Counties, Va.	6	5–6 p. m.	[1] 2		28,000	Hail and wind	Area affected reached from Bybee to Hadensville. Corn, tobacco, and truck crops badly damaged; old buildings wrecked and some unroofed.
Bishopville, S. C.	6	6 p. m.			2,500	Wind	6 houses damaged.
Menomonie, Wis.	6	11 p. m.–midnight.			5,000	Thunderstorm	Roof of grandstand at fair grounds blown off, damaging roof of another building.
Towanda, Pa.	6					do	Wind blew down trees and broke power lines.
York, Pa.	6					do	Wind blew down trees and broke power lines.
Solomons, Md.	6					Wind	Reported as a twister. Occurred inland about 8 miles above Solomons, completely demolishing 2 barns.
Titusville, Fla.	7	3 p. m.		1		Electrical	1 death by lightning.
Roscoe to Paxton, Keith County, Nebr.	7	5 p. m.	[1] 2		30,000	Hail and wind	50 to 100 percent loss of wheat and corn in path 8 miles long.
Lincoln County, N. Mex., southeastern.	8	1–2 p. m.			5,000	Hail	Most of damage to orchards; some windows broken and roofs damaged.
Fernandina, Fla., 10 miles south.	8	Afternoon		1		Electrical	1 death by lightning.
Pensacola, Fla.	8–9	Night			500	Minor tropical disturbance.	Pensacola maximum wind velocity of 32 m. p. h. from southeast. Low areas flooded. Water damage, $500.
Wausau, Fla.	9	4 a. m.		0	8,000	Tornado	House and 2 barns destroyed. Trees downed over large area; 2 minor injuries.
Goldthwaite, Tex.	9	4:50 p. m.			300	Wind	East wind, reaching 60 m. p. h., blew part of roof off lumber yard.
Sidney, Nebr., north of	9	Evening	[1] 1½			Hail	50 percent loss to crops in path 3 to 4 miles long; damage, several thousand dollars.
Roswell, N. Mex.	10	5 p. m.			45,000	Wind	Considerable damage to hangar and planes at Municipal Airport.
Ruidoso, N. Mex.	10	6:30 p. m.			15,000	Hail	
Lynn County, Tex.	10					do	1,200 acres of cotton destroyed in northern part of Lynn County. Some damage at Tahoka.
Haskell, Tex., near	11	4:15 p. m.		0	1,000	Tornado and hail	
Aroostook County, Maine, southern portion.	11	Afternoon				Thunderstorm	Storm described in local press as "twister," but no supporting evidence. Near Houlton, Maine, hailstones were mostly in form of comparatively thin discs, resembling checkers or game counters, and more than 1¼ inches in diameter. Considerable window glass broken in Littleton, Maine, by hailstones. Crop damage slight.
Tahoka, Tex., near	11					Hail	Several hundred acres of cotton east and northeast of Tahoka destroyed.
South Dakota, western portion.	12	Afternoon			500,000	do	Heavy hail damage in Deer Creek, New Underwood, and Box Elder vicinities. Small grain suffered losses from 25 to 50 percent. Some corn wiped out in spots.
Prairie du Chien, Wis., near	12	Afternoon		1		Electrical	1 person killed and another injured by lightning which struck tree under which they were standing.
Milan, Tenn.	13	Afternoon				Thunderstorm	Damage from heavy rain.
Des Moines, Iowa	13	8 p. m.			250,000	do	Clubhouse at Wakonda Club destroyed by fire after being struck by lightning. 5 firemen injured, 4 seriously, when section of wall collapsed. Wind and rain uprooted trees and broke limbs; electric power service disrupted for about 2 hours.

See footnote at end of table

SEVERE LOCAL STORMS FOR JULY 1948—Continued

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
Iowa, scattered localities	13	Afternoon and evening.				Thunderstorms	Heavy rain, wind, and hail. Heavy rain caused damage of $8,000 to property at Perry. Some damage at Marshalltown, Monroe, Newton, and Sac City.
Scioto County, Ohio	13			1		Electrical	Man struck by lightning and killed while standing under a tree; 2 other men injured.
Wellsville, Pa	13					do	Lightning struck and burned a barn.
Braxton, Calhoun, and Marshall Counties, W. Va., portions of.	13–14	During night			157,450	Thunderstorms	General thunderstorm conditions, with locally heavy rains causing flash floods; over 25 homes flooded. Damage to railroad property estimated at $2,000, and damage to highways and bridges estimated at $90,000. Damage to corn, hay, gardens, poultry, farm buildings, and machinery estimated at $65,300 in Marshall County.
Ellis County, Kans	14	4:30 p. m	1 2–6		200,000	Hail	Occurred from Ellis to Hays. Especially severe at Ellis, where 50 to 75 percent of windows on north sides of houses were broken, and roofs and automobiles were badly damaged.
Northeastern Barton, Rice, northern Reno, and Sedgwick Counties, Kans.	14	6:30–9:30 p. m	1 20–30	1	8,730,000	Thunderstorm and small tornado.	Damage especially severe in Nickerson, south Hutchinson, and Wichita. Practically all buildings in Nickerson damaged or demolished. In Hutchinson and Wichita damage greatest of record. Chief damage from wind. A small tornado cloud seen in western Hutchinson, but its effects masked by general windstorm. 30 percent of damage was to crops.
Laramie County, Wyo., eastern portion.	14	7 p. m	1 12		100,500	Hail	Approximately $100,000 damage to growing crops and $500 damage to buildings, automobiles, etc.
Apache, Colo	14	P. m			5,000	do	Principal loss to wheat crop.
Canon City, Colo	14	9:45–11:50 p. m	1 1¾		100,000	do	Hail, size of marbles, caused $50,000 loss to buildings, automobiles, and neon signs, and $50,000 loss to apples, cherries, and truck crops.
Elk County, Kans	14	10:30 p. m	830	0	7,500	Wind and tornado	Storm struck 2½ miles northeast of Howard. Damage to rural property. Tornado moved southeastward in path 300 feet wide and 4½ miles long in connection with general windstorm.
Aguilar, Colo	14	11 p. m	1 1		20,000	Hail	Hailstones an inch in diameter damaged crops.
Trinidad, Colo	14	11:30 p. m	1 5½		250,000	do	Hail caused damage of $200,000 to crops and $50,000 damage to buildings; power lines and equipment over 20-mile-long path.
Kirtley, Wyo	14			0	0	Tornado	Funnel sighted but did not reach ground.
Watkins, Colo	15	6 p. m	1 5½		400,000	Hail	Severe to total loss to grain in path 20 miles long.
Stratton, Colo	15	9 p. m	1 1		100,000	do	Hail an inch in diameter damaged wheat in path 18 miles long.
Scottsbluff County, Nebr., west of Morrill.	15			0		Wind, with tornadic characteristics.	Demolished buildings, including an elevator; overturned empty coal cars.
Scottsbluff County, Nebr., near Mitchell and Gering.	15					Thunderstorm	Hail and rain very destructive to crops in some fields; damage, several thousand dollars.
Lordsburg, N. Mex	16	3:30 p. m			35,000	Wind	Hangar roof and 2 walls blown down; 7 planes badly damaged.
Newport, Jackson County, Ark.	17	Afternoon			10,000	Thunderstorm	Trees uprooted and roofs damaged.
Clay County, Nebr., south of Edgar.	18	9 a. m	1 3–5		100,000	Hail	Crops in some fields totally destroyed in path 15 miles long.
Thayer County, Nebr	18	9 a. m	1 2		10,000	do	Some damage to corn foliage, small grain in shock, and gardens in path 14 miles long.
Baldwinsville, N. Y	18	2:30–3 p. m	220		700	do	A very localized hailstorm, with stones up to 1½ inches in diameter, caused $100 damage to buildings and $600 loss to crops.
Pine Bluff, Jefferson County, Ark.	18	Afternoon			3,000	Thunderstorm	2.47 inches of rain in slightly less than an hour, flooded streets and 2 bakeries.
Opa-Locka, Fla., near Miami.	18	Afternoon		0		Tornado	Some windows broken.
Wilkes-Barre, Pa	18	5:15 p. m				Thunderstorm	Trees and branches snapped; windows blown out; and great damage to utilities by wind, rain, and lightning.
Glenrock, Wyo., near	18		800	0		Tornado and hail	2 sheep wagons demolished and considerable amount of timber uprooted. Damage slight.
Waunakee, Wis., near	19	5–5:30 a. m	1 1–1½		67,500	Hail and wind	Length of path 4½ miles. Some hailstones 1½ inches in diameter. Main damage to small grains, corn, and tobacco.
Lyon and Osceola Counties, Iowa.	19	4:30–5:30 p. m	1 3–5		140,000	do	Hail accompanied by strong wind and heavy rain, mowed path from 3 miles south of Little Rock, Lyon County, eastward to near Ashton and south of Melvin in Osceola County. Worst damage from hail, Ashton to Melvin area. Corn and soybeans stripped of leaves and stalks broken. Oats badly stripped. In storm area, 5 miles wide and 25 miles long, over-all destruction estimated at 15 to 25 percent, with total destruction in spots. Power service interrupted in Ashton from broken lines. Property damaged on 24 farmsteads, mainly from high winds. Hailstones averaged only ½ inch in diameter but fell with great intensity and in large numbers, causing heavy damage. Damage to growing crops, $100,000; remainder of loss to farm buildings. 2 injuries.
Jackson, Wyo	19			1		Electrical	Boy struck and killed by lightning.
St. Louis, Mo	19	10:22 a. m			2,000	Electrical, wind, and rain.	Thunderstorm from northwest blew down trees and wires and slightly injured 4 persons. Lightning struck 4 buildings and a streetcar, resulting in $2,000 damages. Heavy, driving rain cut visibility to 1/16 mile.
Wateree Township, 10 miles south of Camden, S. C.	19	6:45 p. m		4	1,000	Electrical	Dwelling caught fire from lightning, and 4 occupants burned to death.
Sandy River community, Pittsylvania County, Va.	19	Late afternoon		1		do	Lightning killed 1 person and stunned several others among group of 8 in tobacco barn.
Monroeton, Pa	19			1		do	Lightning struck and killed man.
Towanda, Pa	19			1		do	Lightning struck and killed man; also set fire to a house.
Wateree Township, 10 miles south of Camden, S. C.	20	Afternoon			2,000	do	2 race horses killed by lightning.
Meeker, Colo	20	Afternoon		1		do	Man struck by lightning died.
Princess Anne County, Va	20	Late afternoon			25,000	Wind and electrical	Area of destruction from Bayville Farms to Virginia Beach Airport. 7 prize cows killed; hangar and 5 planes destroyed; 1 automobile crushed.
Northeastern Swift and northwestern Kandiyohi Counties, Minn.	20	P. m	1 2		65,000	Hail	Heavy hail that accompanied a severe thunderstorm caused much damage to growing crops and some to real property.
Fairmont, Minn., vicinity of.	20	8 p. m			1,000	Electrical	Several farm animals killed by lightning.
N. Dak., southwestern portion.	20	Late evening	1 20		30,000	Wind and hail	About a dozen small farm buildings blown down in Grant and southwestern Morton Counties.
Iowa, southern portion	20	Night				Rain	6.20 inches of rain at Greenfield, and 5.35 inches of rain at Atlantic in little more than 4 hours. No serious damage.
South Dakota, central portion.	20					Hail, wind, and rain	Hail in Lyman, Mellette, Jones, and Tripp Counties damaged crops from 10 to 100 percent. Hail and high winds damaged crops, up to 100 percent loss in Sanborn County. Lightning in Brown County wrecked several buildings and high winds and heavy rain damaged some hay crops.
Rock Island-Moline area, Ill.	21	1:15 a. m			20,000	Rain	3.42 inches of rain at Moline Airport flooded streets, washed out gardens, and beat down small grains. Some unimproved streets washed out.
Smith Valley, Johnson County, Ind.	21	6 a. m				do	Honey and Sutton Creeks overflowed. Crops covered with mud. 2 small bridges washed out.

See footnote at end of table

SEVERE LOCAL STORMS FOR JULY 1948—Continued

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
Keenesburg, Colo.	21	1:30–2 p. m.	[1] 1¼		11,000	Rain	Hailstones up to the size of pigeon eggs caused severe damage 2 miles west of Prospect Valley. Beans, small grains, cabbage, beets, potatoes, and hay were principal crops affected.
Cuba City and Benton, Wis.	21	8:45–10 p. m.			1,000	Wind and rain	Trees and utility lines downed in places.
Fairfield, Hocking, Pickaway, and Athens Counties, Ohio.	21–22	11 p. m.–1 a. m.			2,000,000	Rain	Flash flood in upper Hocking River and tributaries. More than 10 inches of rain in about 3 hours over an area of several square miles. 18 bridges washed out; 3 carloads of lumber floated away; and business establishments damaged. 2,000 homes flooded in Lancaster and several destroyed. Lowlands along Hocking River flooded from above Lancaster to Athens. Corn and wheat in shock damaged and livestock drowned.
Maricopa and Yuma Counties, Ariz.	22	Early morning			2,000	Thunderstorms	Highway damage from washing, near Peoria, Morristown, Bouse, and at 12-Mile Hill near Ehrenberg. Traffic disrupted several hours.
Virden, Macoupin County, Ill.	22	4:14 a. m.			5,000	Wind	A few buildings damaged by falling trees.
Chatham area, Sangamon County, Ill.	22	4:30 a. m.	[1] 1		70,000	do	Most of damage to corn and oats. One building under construction blown down.
Glen Carbon area, Madison County, Ill.	22	5 a. m.	880		20,000	do	Several porches blown off homes and several roofs damaged. Considerable crop damage.
Decatur area, Ill.	22	5:15 a. m.			20,000	do	Heaviest damage to oats and corn. A few thousand dollars damage to airplanes at municipal airport and considerable other minor damage.
Ingham and Eaton Counties, Mich.	22	6–6:18 a. m.	[1] 2		20,000	Thunderstorms	Extensive crop damage. Barns, trees, and utility poles blown down; electric and telephone lines damaged. One person injured. Livestock killed. Airplane damaged when blown across highway. Most damage in V-shaped strip extending north and east of Eaton Rapids. Minor blows 2 miles north of Charlotte, again in Leslie section, and area just west of Mason.
Waukesha, Wis., and vicinity.	22	1:15–2 p. m.	[1] 1		20,000	Wind, hail, and rain	Falling trees broke power lines and damaged a car and several homes; wind and heavy hail damaged some roofs, broke store windows, and flattened small grain. Estimated damage by hail, $2,500 to property and $2,500 to crops; hailstones up to 2 inches in diameter.
Nashville, Tenn.	22	Afternoon			250,000	Thunderstorm	Damage to telephone and power lines.
Rockford area, Ill.	22	4 p. m.	[1] 4	0	210,000	Wind and possible tornado.	Storm swept 14-mile path through Winnebago County. Several buildings unroofed; many trees uprooted; severe damage to crops, mainly corn and oats.
Pueblo, Colo.	22	8:26–9:59 p. m.			165,000	Hail and wind	Hail in east and south portions of city damaged gardens and buildings. Hail losses estimated at $130,000; wind damage, $35,000.
Harrisburg, Pa., vicinity	22	Night				Thunderstorm	Strong winds damaged utility lines; both feeder lines, of 66,000 and 12,000 volts, respectively, from Harrisburg to Carlisle were knocked out.
New Park, Pa.	22	11 p. m.			10,000	Electrical	Lightning struck and burned barn.
West Virginia, north-central sections.	22–23	Evening to early morning.				Thunderstorms	Locally heavy rains caused flash floods. Wash-outs and landslides disrupted railroad and highway traffic. Damage to crops and gardens from high winds and floodwaters. Damage estimated in hundreds of thousands of dollars.
Coachella Valley, Calif., western portion.	23	12 midnight–3 a. m.			75,000	Thunderstorm	Storm extended from Cabazon to Indio but most severe around Palm Springs, Garner, and Desert Hot Springs. Basements flooded, building foundations, roads, and part of All American Canal washed out. Highway traffic disrupted.
Cambridge, Md.	23	12:30 p. m.		1		Electrical, wind, and rain.	Lightning struck and killed boy as he crouched near mast of log canoe; 1 other boy stunned. Strong gusts toppled trees; power and electrical service disrupted. Streets and roads inundated by heavy rain. Wind toppled smokestack at lumber plant. Lightning struck at least 5 different buildings.
Duncannon, Pa.	23	7 p. m.			1,800	Electrical	Lightning felled 155-foot television tower.
Penn Line, Pa.	23					Thunderstorm	Wind damaged trees and electric lines; also blew down barn.
Price, Utah	24	12 noon–12:45 p. m.	[1] 1			Hail	Hailstones up to 2 inches in diameter affected area 2 miles long. Considerable damage to property: Roofs damaged, neon signs broken, plate glass windows smashed, and gardens destroyed.
Casper, Wyo.	24	4 p. m.	[1] 30		4,000	Wind	$1,000 damage to trees in Casper. Small airplane, valued at $3,000, demolished at Wardwell Field.
Jacksonville, Fla.	24	5–8 p. m.				Thunderstorm	Naval Air Station reported gusts up to 43 m. p. h. WPDQ radio tower struck and damaged by lightning; station off air 40 minutes. Minor damage to telephone and power lines.
Clearwater, Fla.	24	5:35 p. m.	50	0	1,500	Waterspouts and tornadoes.	2 waterspouts from Gulf, becoming small tornadoes. 1 small tornado formed inland. Roofs blown from 2 houses. Several small boats damaged.
Beardsley, Minn., and vicinity.	24	9:50 p. m.	[1] 2		50,000	Thunderstorms	4 barns wrecked; trees, silos, and windmills blown over; poles and wires down; homes, small buildings, and farm machinery damaged.
South Dakota, western portion.	24					Hail and wind	Severe storm damaged crops and buildings in vicinity of Sturgis. Some crops up to 90 percent loss. Many barns and sheds blown down.
Chapin area, Morgan County, Ill.	25	5:15 p. m.			15,000	Wind and rain	Wind damaged several homes and other buildings. Rain washed out sections of railroad track.
Springfield area, Ill.	25	5:20 p. m.			10,000	do	Many trees blown down; several basements flooded; many power lines down; some damage to crops. 3 persons injured, none seriously.
Elsberry, Lincoln County, Mo.	25	7 p. m.				do	Minor damage to buildings, utility lines, and automobiles caused by falling tree limbs. Minor damage to crops in lowland areas from standing water.
Cassville, Barry County, Mo.	26	2:30 a. m.				do	Trees blown down in western part of county, and limbs torn from trees in other sections. Heavy rain accompanied storm.
Stuttgart, Arkansas County, Ark.	26	Evening			5,000	Thunderstorm	2.02 inches of rain fell in a 35-minute period, flooding streets to depth of 20 inches.
Des Moines, Iowa	27	1:45–1:55 a. m.			50,000	Wind	Driving rain and local windstorm struck Des Moines Airport, damaging hangar and about 35 airplanes, 4 beyond repair. 60-m. p. h. winds, with strong gusts. A maximum instantaneous gust of 95 m. p. h. reported. Roof ripped off hangar and door blown in. Damage to airplanes $24,500; the remainder to hangar. Trees uprooted or blown over.
Nuckolls County, south of Nelson, Nebr.	27	3:30 a. m.	[1] 2			Hail	Damage varied considerably, reaching 100 percent to some corn. Path 5 miles long.
Sullivan and Linn Counties, Mo.	27	1–2 p. m.	[1] 1–3		110,000	Hail and wind	Storm originated near Browning, and moved southeastward into Linn County. Only minor damage to crops in Sullivan County, but in Linn County, particularly in New Garden area, hail damage was severe. Some cornfields completely destroyed. Hailstones ranged from ½ to 4½ inches in diameter. Communication and power lines broken by wind. Damage to crops estimated at $60,000, and to property, $50,000. Bulk of damage caused by hail.
Big Timber Ridge, Botetourt County, Va.	27	5 p. m.		1		Electrical	Man killed by lightning.
Parke County, Ind.	27	5:30 p. m.	[1] 2		2,500	Hail and wind	Hail up to 1 inch diameter.
Brazil, Ind., vicinity of	27	6 p. m.	[1] 1		75,000	Hail	Stones up to 2 inches diameter. Heavy rain.
Linesville, Pa.	27					Electrical	Lightning struck and burned barn; many trees and 2 silos blown down.
Dalhart, Tex.	27	9:30 p. m.		0	1,000	Tornado	

See footnote at end of table

SEVERE LOCAL STORMS FOR JULY 1948—Continued

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
Potsdam, N. Y.	27	10 p. m.				Hail	Hailstones ranging up to 2 inches in diameter fell in portion of Potsdam, breaking windows, denting automobile tops, and making 46 holes in fuselage of an airplane.
Wheeling-Ohio County, Airport, W. Va.	27	11:05 p. m.				Wind	Gusty 30-m. p. h. wind, accompanying squall line, caused wreckage of a helium-filled blimp being secured to mooring mast.
Central Counties, Ohio	27					Hail, wind, and electrical.	Hail did considerable damage to corn and oats in Champaign and Marion Counties; also some wind damage. Considerable wind damage in Delaware and Licking Counties. Several buildings, planes, and hangars destroyed at Barberton, Summit County, by fire apparently started by lightning.
Havre, Mont., vicinity	27					Wind and dust	Thundersquall with wind of 40 m. p. h. damaged ripening barley and spring wheat; 10 to 50 percent loss reported from about 40 farms. Dust reduced visibility to ½ mile for 32 minutes.
Harlan and Furnas Counties, Nebr.	28	7 p. m.				Hail and wind	Considerable damage to crops and buildings.
Gosper County, Nebr., northwest third.	28	7:30 p. m.	[1] 15		100,000	do	Path 25 miles long. Small buildings blown over; moderate to 100 percent corn damage.
Knox County, near Wausa, Nebr.	28	Night				Electrical	Lightning set fire to barn, which burned down. Considerable damage.
Lancaster, Wis., 9 miles east	29	5:15 p. m.	50	1	25,400	Tornado	Destroyed a large hay-filled barn, injuring 2 men, 1 fatally; 2 smaller buildings wrecked; 400 chickens killed. Wrecked farm home and machine shed and damaged machines on another nearby farm. Funnel cloud moved northeastward and lifted. Probably same tornado that later struck near Linden and again near Springfield Corners, Wis.
Leroy and Union Townships, Benton County, Iowa.	29	5:10—5:30 p. m	100	0	23,000	do	Storm originated near Belle Plaine; traveled northeastward along path of 6 miles; lowered and touched ground several times. No damage north of Highway 30. About 6 farmsteads damaged. Crop loss small.
Linden, Wis., 3 miles west	29	5:25 p. m.	333	0	11,100	Small tornado	Storm moved northeastward in path 1 mile long. Destroyed 1 barn; damaged 6 smaller buildings; injured 3 head of livestock; blew down trees; damaged oats and corn.
Springfield Corners, Wis., 2 miles northwest.	29	6 p. m.	133	1	21,500	Tornado	Storm moved northeastward. Funnel cloud touched ground 3 times in 2-mile path. Demolished house; killed 1 and injured 11 persons; wrecked barn and garage; damaged another barn and several smaller buildings; killed several hundred chickens; damaged corn, grain, and hay.
La Crosse, Wis., 4 miles southeast.	29	6:20-6:50 p. m.		0	500	Small tornado	Funnel cloud observed moving northeastward up side of ridge and lifting. Path short. Trees uprooted near Maple Grove Club, blocking highway and disrupting communication service; 10 acres of corn damaged.
Cascade to Dubuque, Dubuque County, Iowa.	29	7:30-8:45 p. m.		0	300,000	Tornado	Tornado formed north of Cascade in heavy thunderstorm. Several funnel-shaped clouds observed in rain area 5 miles northwest of Cascade. One funnel larger and more prominent than the rest and accounted for most of damage as it traveled northeastward, skipping over countryside. Funnel-shaped clouds retained their characteristics until after they passed through the extreme northwest section of Dubuque. Damage confined strictly to path of tornado, which varied considerably in width; greatest width, 5 miles, northwest of Cascade. Storm losses to crops, $50,000, included in total.
Picher, Ottawa County, Okla.	30				100,000	Electrical	Lightning struck mill at zinc and lead smelter.
Enid, Garfield County, Okla	30				25,000	Wind and electrical	Principal damage by high wind to hangars and other buildings at air base. Lightning burned out pumps at city's wells.

[1] Miles instead of yards.

LATE STORM REPORTS FOR MAY AND JUNE 1948

[The table hereunder contains such data as were received concerning severe local storms that occurred during these months. A revised list will appear in the United States Meteorological Yearbook]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
New Danville, Fairview, and Refton, Lancaster County, Pa.	*May* 17	5 p. m.	[1] 6			Hail	Hailstones in size from peas to small cherries, fell to depth of 8 inches locally. Much damage to vegetables and flowers; interruptions to power service.
Verona and vicinity, Lawrence County, Mo.	*June* 21	8:23 p. m.	300		$3,000	Wind	Many trees uprooted or broken off, some falling on houses, barns, and an automobile; several outbuildings demolished and some barns unroofed; telephone service disrupted. Reported as tornado, but evidence insufficient. Some wheat and oat fields flattened, with slight damage.
Wakenda, northwest of, Carroll County, Mo.	22	10:15 p. m.	20		3,100	do	Storm struck 2 farms, damaging a new machine shed at one farm and felling tree on house at other. Wheat damaged to some extent.

[1] Miles instead of yards.

SOLAR RADIATION DATA FOR JULY 1948

[Solar Radiation Investigation Section, I. F. HAND in Charge]

Explanation of Tables 1 and 2 and references to descriptions of instruments, stations, and methods of observation, and to summaries of data, are given in the Monthly Weather Review, vol. 72, No. 1, January 1944, p. 43. A list of pyrheliometric stations is given on page 45 of that issue. An explanation of the formula used in computing the air mass values for each station listed in Table 1 appears in vol. 75, No. 3, March 1947, p. 47.

In mid-July the Bureau installed a Brown Electronik potentiometer to record total solar and sky radiation on a horizontal surface at Blue Hill. Formerly these measurements were made with Harvard equipment. For the time being, the Harvard Eppley pyrheliometer will serve as the receiver for check purposes.

TABLE 1.—*Solar radiation intensities during July 1948*

[Gram calories per minute per square centimeter of normal surface]

Date	Sun's zenith distance									Vapor pressure	
	A. M.				0.0°	P. M.					
	78.7°	75.7°	70.7°	60.0°		60.0°	70.7°	75.7°	78.7°	7:30 a. m.[1]	1:30 p. m.[1]
MADISON, WIS.											
	Air mass										
	4.81	3.84	2.88	1.92	*0.96	1.92	2.88	3.84	4.81		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1	0.76	0.87	0.99	1.15	1.32					11.8	11.0
2					1.20	0.87	0.62			19.0	20.4
3	.64	.75	.88	1.04	1.29					21.1	19.6
5		.59	.71	.81	1.08	.95				21.1	23.4
8	.49	.60	.69	.86	1.07					15.8	18.3
9	.53	.68	.79	.95	1.18					15.3	15.3
10	.32	.41	.53	.68						17.0	17.0
16		.68	.90	1.03	1.36					21.8	16.5
23					1.36					12.7	13.2
24	.75	.84	.94	1.13	1.32					14.8	12.3
26	.84	.92	1.04	1.16	1.33					15.8	11.8
27	.76	.83	.94	1.11	1.36					17.7	12.3
28	.75	.81	.94	.98	1.35	.98	.68	.50		15.3	13.2
30	.81	.91	1.03	1.18	1.39	1.14				14.2	15.8
31	.84	.92	1.06	1.19	1.36					13.2	12.7
Means	.68	.75	.86	1.01	1.28	.98	(.65)	(.50)			
Departures	+.05	+.01	.00	−.03	.00	−.01	−.23	−.23			
LINCOLN, NEBR.											
	Air mass										
	4.77	3.81	2.86	1.91	*.95	1.91	2.86	3.81	4.77		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
1					1.33	1.06	0.90	0.77	0.64	16.9	21.1
2					1.32	1.03	.82	.64	.54	20.4	21.1
6					1.34	1.08	.84	.67	.56	22.6	21.1
Means					1.33	1.06	.85	.69	.58		
Departures					.00	.00	−.03	−.06	−.08		
BLUE HILL, MASS.											
	Air mass										
	4.86	3.89	2.92	1.94	*0.97	1.94	2.92	3.89	4.86		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
2	0.68	0.82	0.96	1.14	1.44					14.8	12.8
3	.59	.71	.88	1.11	1.39	1.06	0.75			13.8	16.0
4				1.09	1.30					16.5	15.8
7					1.37	1.15	1.00	0.86	0.75	11.6	11.3
8	.71	.82	.97	1.16	1.34	1.12	.93			13.9	11.9
9					1.28					13.8	12.8
11	.53	.66	.82	1.02		1.02				19.8	22.4
15					1.37	1.11	.91	.78	.66	14.5	17.6
16	.82	.92								16.6	15.7
17				.98						17.5	16.5
20	.59	.69	.83						.56	17.7	18.6
22				1.05	1.49					16.1	14.3
24							.93	.81	.72	16.3	20.9
25	.83	.92	1.05	1.20	1.38		.92	.78	.69	13.9	18.4
26				1.04						14.9	18.4
29	.84	.96	1.08	1.19	1.39					17.4	18.4
30	.71	.80	.93	1.14	1.45					17.7	16.9
31					1.49					26.3	16.5
Means	.70	.81	.94	1.10	1.39	1.09	.91	.81	.68		
Departures	+.06	+.08	+.06	+.06	+.10	+.07	+.07	+.11	+.06		

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TABLE 1.—*Solar radiation intensities during July 1948*—Continued

Date	Sun's zenith distance									Vapor pressure	
	A. M.				0.0°	P. M.					
	78.7°	75.7°	70.7°	60.0°		60.0°	70.7°	75.7°	78.7°	7:30 a. m.[1]	1:30 p. m.[1]
CLIMAX, COLO.											
	Air mass										
	3.24	2.59	1.94	1.29	*0.65	1.29	1.94	2.59	3.24		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
2			1.08	1.18							
21			1.13	1.29							
22			1.15	1.30		1.22	1.09	1.01	0.94		
30						1.28	1.14	1.03	.94		
31								1.01	.90		
Means			1.12	1.26		(1.25)	(1.12)	1.02	.93		
Departures			−.07	+.07		−.04	−.06	−.03	−.02		
TABLE MOUNTAIN, CALIF.											
	Air mass										
	3.76	3.01	2.26	1.51	*0.75	1.51	2.26	3.01	3.76		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
2				1.43							
3	1.12	1.21	1.30	1.42							
4				1.42							
5				1.43							
7				1.46							
8				1.46							
9				1.45							
10				1.48							
11				1.47							
12				1.47							
13				1.51							
14				1.46							
15				1.36							
16				1.40							
19				1.41							
20				1.42							
21				1.40							
24				1.47							
25				1.49							
28				1.37							
29	1.10	1.18	1.29	1.40							
30				1.38							
31				1.37							
Means	(1.11)	(1.20)	(1.30)	1.43							
Departures	.00	.00	.00	+.03							
BOSTON, MASS.											
	Air mass										
	4.96	3.96	2.97	1.98	*0.99	1.98	2.97	3.96	4.96		
July	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mb.*	*mb.*
2				1.01						15.3	13.2
8				1.13						12.3	9.3
20				.89						17.7	15.7
29				1.13						17.7	15.3
30				.99						17.0	15.7
Means				1.03							
Departures				+.07							
RATIO, BOSTON/BLUE HILL ON COMPARABLE DATES											
				0.91							

* Extrapolated.

[1] 75th meridian time.

TABLE 2.—*Daily totals and weekly means of solar radiation (direct + diffuse) received on a horizontal surface*

[Gram-calories per square centimeter]

Date	Washington, D. C.	Madison, Wis.	Lincoln, Nebr.	New York, N. Y.	Fresno, Calif.	Fairbanks, Alaska	Columbia, Mo.	Boston, Mass.	Nashville, Tenn.	Twin Falls, Idaho	La Jolla, Calif.	Riverside, Calif.	Blue Hill, Mass.	Newport, R. I.	Salt Lake City, Utah	State College, Pa.	Davis, Calif.	Toronto, Canada	Ithaca, N. Y.	Boulder, Colo.	East Wareham, Mass.	Honolulu, T. H.	Pearl Harbor, T. H.	East Lansing, Mich.	Summit, Mont.	Soda Springs, Calif.	Grand Lake, Colo.
1948	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
July 2	706	688	744	748	773	215	774	706	657	630	507	641	724	750	578	404	753	604	520	-----	643	643	571	308	812	844	484
July 3	500	739	735	429	811	374	488	524	598	448	654	677	710	759	-----	361	759	648	311	-----	686	738	633	568	760	854	621
July 4	541	435	741	666	801	622	271	631	557	520	664	743	670	716	752	592	735	524	513	-----	660	528	426	533	696	805	803
July 5	594	656	488	528	799	408	506	375	468	643	684	763	464	605	739	494	507	366	396	-----	579	408	579	472	699	775	583
July 6	586	692	590	524	788	281	774	349	602	716	687	745	506	535	725	450	654	479	209	-----	443	578	649	491	649	454	657
July 7	323	678	730	293	784	487	674	611	689	701	646	774	642	570	737	256	704	700	337	-----	615	763	657	536	579	745	635
July 8	667	677	752	697	788	156	737	633	-----	515	593	732	735	750	711	736	731	635	524	568	643	755	687	628	739	831	769
Means	560	652	650	555	792	364	603	547	595	596	634	725	636	669	707	470	692	565	402	-----	610	631	600	505	705	758	650
Departures	+43	+97	+58	+44	+87	−100	−28	+7	+94	−13	+64	+102	+70	+103	+20	−38	−26	+27	−125	-----	+65	+5	+25	−15	-----	-----	-----
July 9	737	675	512	636	793	397	780	565	-----	702	655	729	681	671	769	754	709	605	486	711	574	593	625	578	712	816	815
July 10	633	557	469	628	764	384	686	573	-----	680	470	706	637	630	746	698	714	579	487	386	566	706	677	383	475	789	384
July 11	510	580	380	617	804	650	633	606	-----	493	603	694	682	700	770	538	717	509	399	707	627	775	680	499	372	832	755
July 12	633	461	434	555	797	487	325	539	-----	685	484	689	618	619	686	428	708	424	382	694	571	320	414	458	800	820	648
July 13	413	252	631	196	776	426	571	200	-----	472	372	612	283	323	490	250	703	300	143	645	339	766	443	145	756	786	744
July 24	148	613	671	543	734	647	478	287	-----	614	272	719	300	420	726	569	696	631	450	611	306	696	678	432	618	787	814
July 15	418	156	410	602	731	569	412	667	-----	696	232	734	719	670	719	551	694	692	518	574	654	669	378	555	414	790	801
Means	499	471	519	540	771	509	555	491	-----	620	441	698	560	576	701	541	706	534	409	618	520	646	556	436	592	802	708
Departures	0	−77	−70	+59	+73	+11	−49	+22	-----	+3	−147	+94	−45	+54	+14	−3	+12	+18	−91	+62	+9	+5	−38	−7	-----	-----	-----
July 16	548	710	634	508	738	534	628	571	-----	685	236	736	680	734	717	584	712	133	383	499	679	619	568	334	388	786	756
July 17	336	622	507	212	742	533	598	528	-----	558	454	685	642	636	620	388	702	519	258	429	631	624	548	493	740	805	630
July 18	666	610	585	344	766	356	257	494	-----	658	466	682	560	516	670	471	681	653	398	406	526	662	590	408	284	804	401
July 19	439	650	459	465	760	287	374	390	-----	657	394	630	468	519	501	516	691	460	254	448	476	428	547	480	226	800	573
July 20	391	382	600	426	753	107	255	502	-----	683	387	680	611	670	713	400	685	517	445	667	628	768	665	395	231	785	416
July 21	464	554	593	454	722	323	597	372	-----	680	569	707	454	390	699	373	696	348	267	443	522	733	693	219	520	776	503
July 22	540	376	418	524	722	580	387	603	-----	507	338	555	674	682	580	455	689	247	394	-----	697	778	698	244	699	773	816
Means	484	558	553	419	743	389	442	494	-----	632	406	668	584	592	643	455	694	411	343	482	594	659	616	368	441	790	585
Departures	−3	+22	−21	−40	+59	−40	−156	+68	-----	+15	−135	+86	+92	+107	+3	−29	+3	−53	−149	−15	+110	+10	+14	−88	-----	-----	-----
July 23	414	634	706	78	751	320	789	215	-----	614	456	642	282	358	262	300	710	342	216	-----	356	764	681	181	599	793	771
July 24	692	738	728	666	767	343	770	453	-----	622	387	689	573	567	544	638	644	638	330	379	482	768	688	512	638	791	296
July 25	728	304	628	665	751	572	456	559	-----	678	612	714	649	654	681	594	670	455	492	491	646	773	686	374	655	784	561
July 26	632	709	491	514	766	239	650	404	516	647	566	649	499	535	640	400	683	194	165	654	557	765	637	524	721	796	648
July 27	324	686	714	392	767	234	484	233	208	606	507	571	290	337	689	578	672	318	389	522	350	747	599	414	454	791	628
July 28	504	688	642	532	735	354	688	352	324	636	614	616	383	500	492	529	684	601	363	275	380	599	495	499	134	778	306
July 29	591	310	629	647	717	517	563	538	661	667	629	701	659	700	694	705	654	594	498	696	646	626	604	478	216	561	773
Means	555	581	610	499	750	368	629	394	440	638	539	655	477	522	572	535	674	449	350	503	488	720	627	426	488	788	569
Departures	+60	+62	+57	+50	+72	−37	−71	−29	−38	+59	+21	+96	+14	+31	+1	+44	+16	−1	−104	−12	+26	+73	+23	−53	-----	-----	-----

ACCUMULATED DEPARTURES ON JULY 29, 1948

	− 1624	+ 3451	+ 3885	− 6328	+ 9401	} ----	----	{ − 4781 }	----	{ − 2352	− 2359	+ 10367	− 4543	− 2478	− 847	− 3675	− 3668	+ 2128	− 15603	} ----	{ − 3122 }	----	----	{ + 434 }	----	----	----

TABLE 3.—*Daily totals and weekly means of solar and sky radiation plus the radiation reflected from the ground, as received on a vertical surface facing south at Blue Hill, Mass., during July 1948*

Date	2	3	4	5	6	7	8	Mean	9	10	11	12	13	14	15	Mean
Gm cal/cm²	232	241	231	200	210	224	238	225	242	245	244	251	130	116	250	211

Date	16	17	18	19	20	21	22	Mean	23	24	25	26	27	28	29	Mean
Gm cal/cm²	239	243	246	191	231	192	244	226	132	243	234	209	123	175	271	198

Chart I. Departure (°F.) of the Mean Temperature from the Normal, and Wind Roses for Selected Stations, July 1948

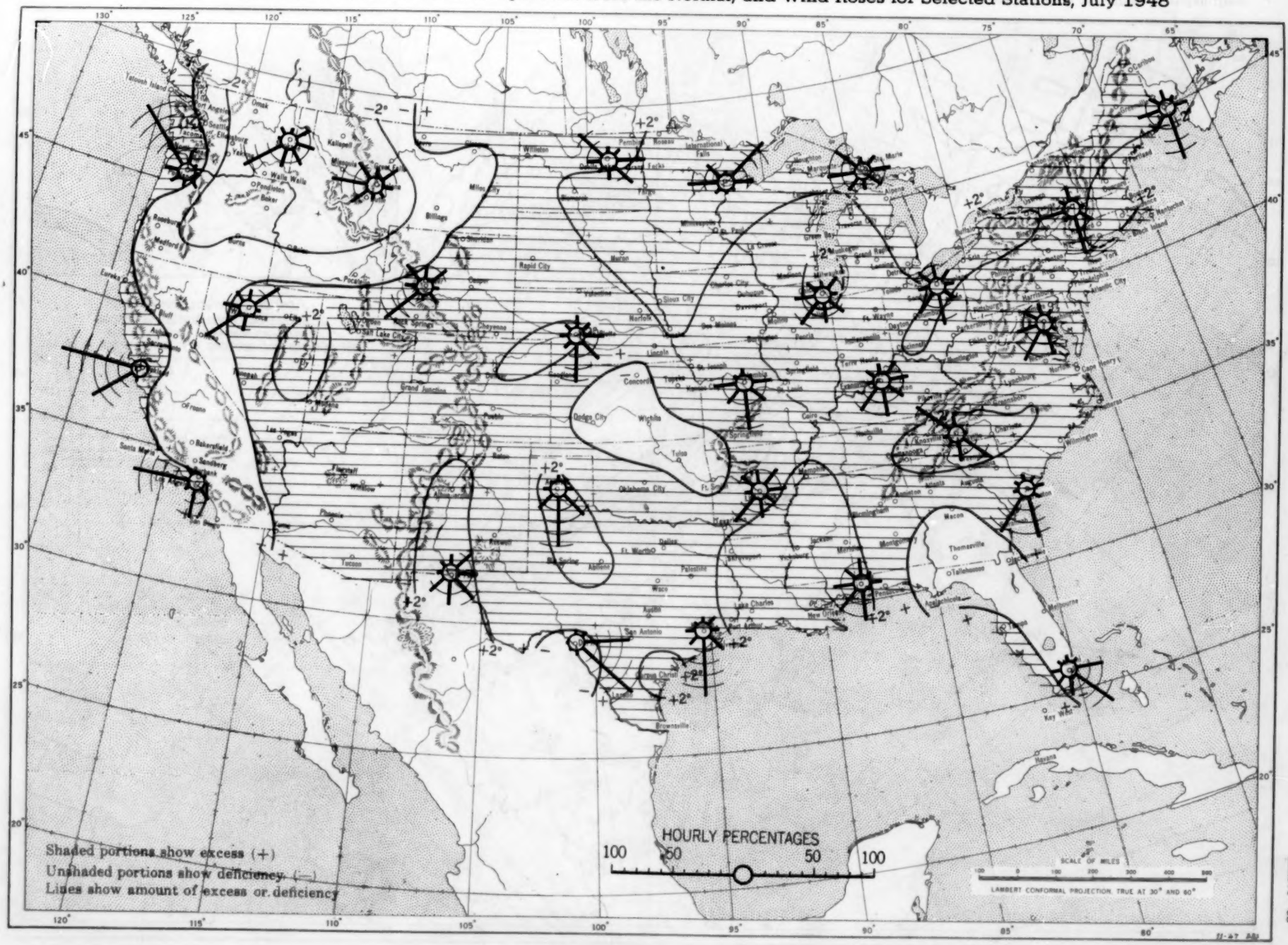
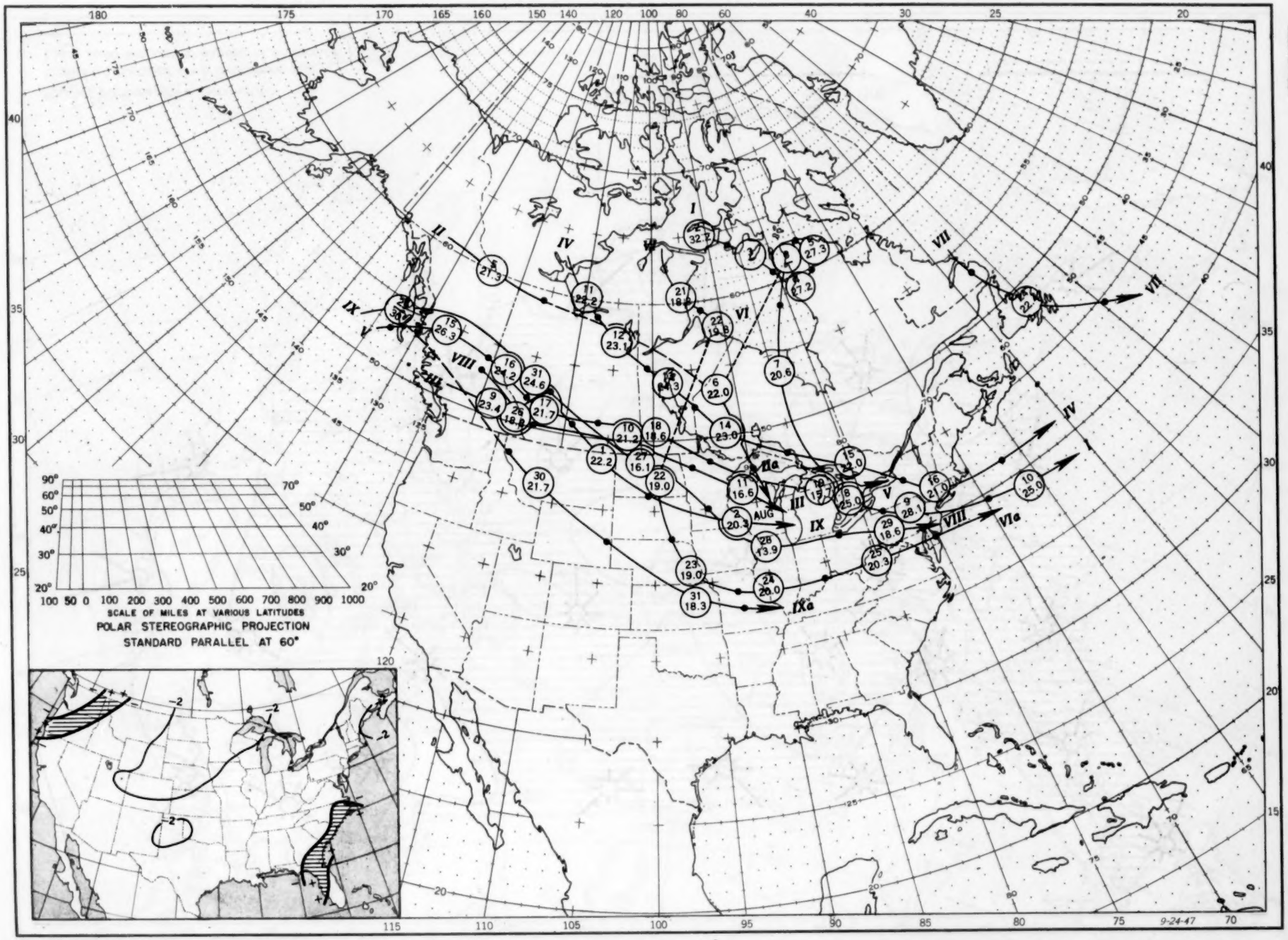

Shaded portions show excess (+)
Unshaded portions show deficiency (−)
Lines show amount of excess or deficiency
HOURLY PERCENTAGES
100 50 50 100
SCALE OF MILES
LAMBERT CONFORMAL PROJECTION TRUE AT 30° AND 60°

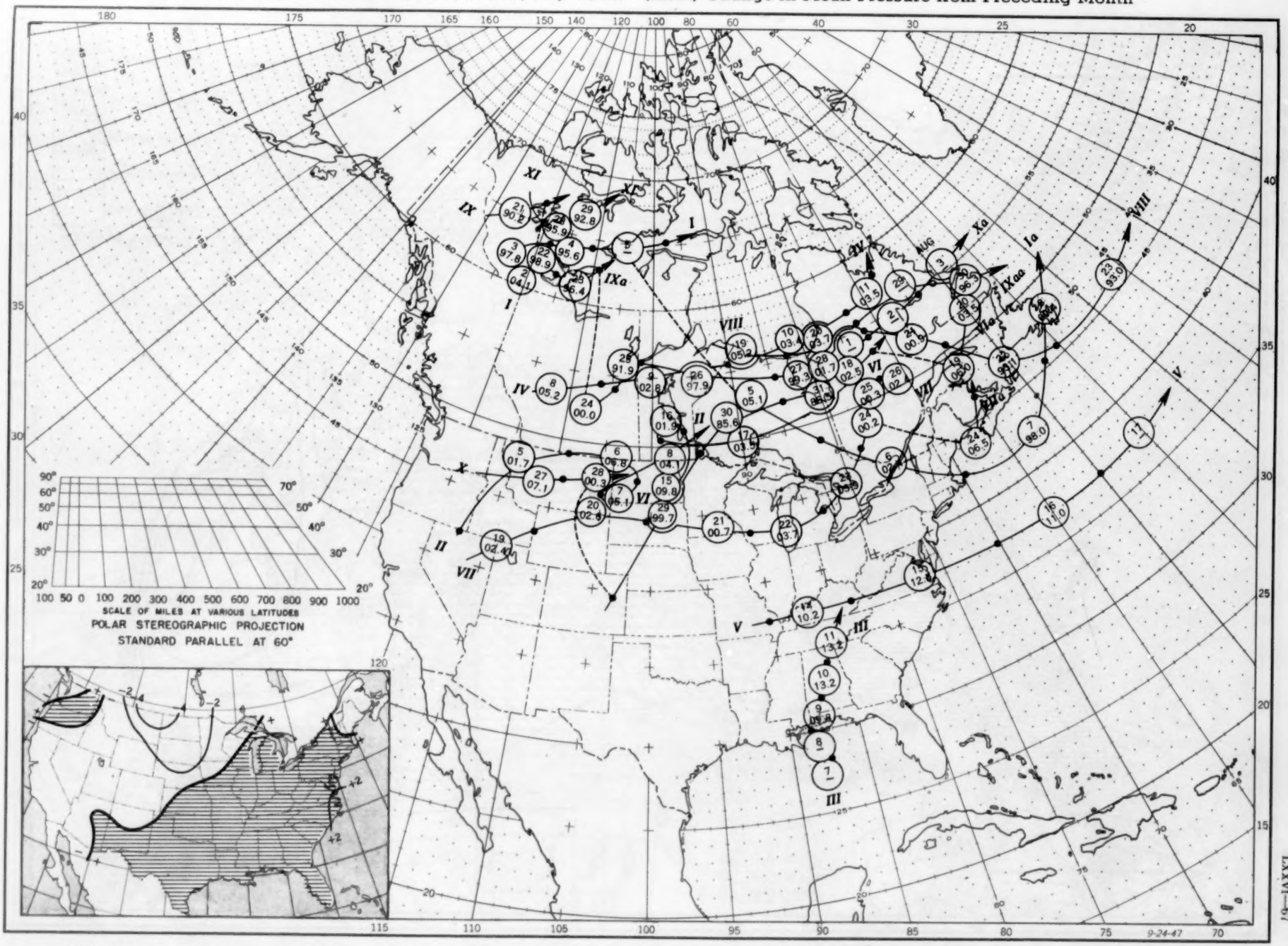
Chart II. Tracks of Centers of Anticyclones, July 1948. (Inset) Departure of Monthly Mean Pressure from Normal



Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of anticyclone at 7:30 p. m. (75th meridian time)

Circle indicates position of anticyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position

Chart III. Tracks of Centers of Cyclones, July 1948. (Inset) Change in Mean Pressure from Preceding Month



Circle indicates position of cyclone at 7:30 a. m. (75th meridian time), with barometric reading. Dot indicates position of cyclone at 7:30 p. m. (75th meridian time)

Chart IV. Percentage of Clear Sky Between Sunrise and Sunset, July 1948

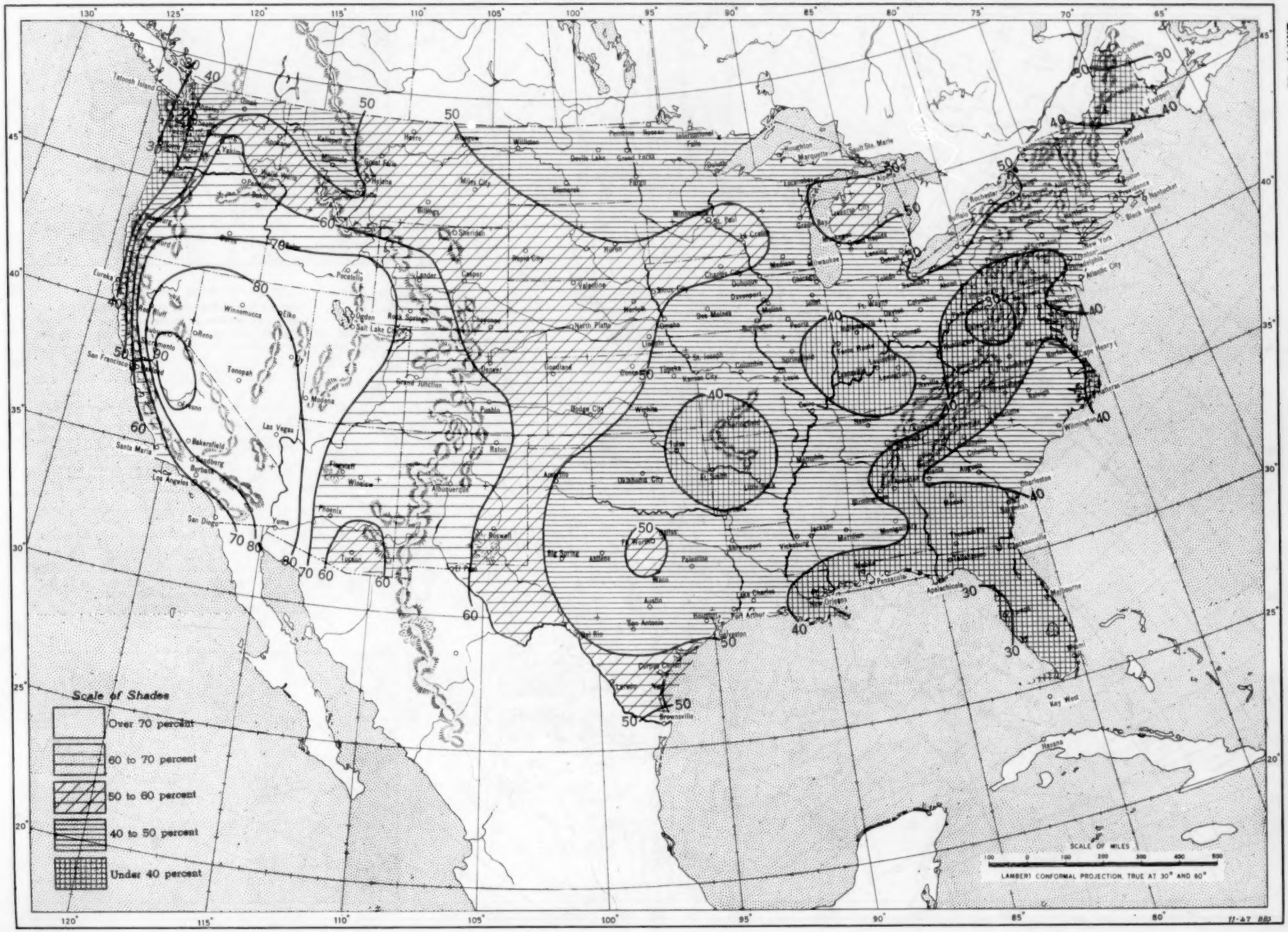


Chart V. Total Precipitation, Inches, July 1948. (Inset) Departure of Precipitation from Normal

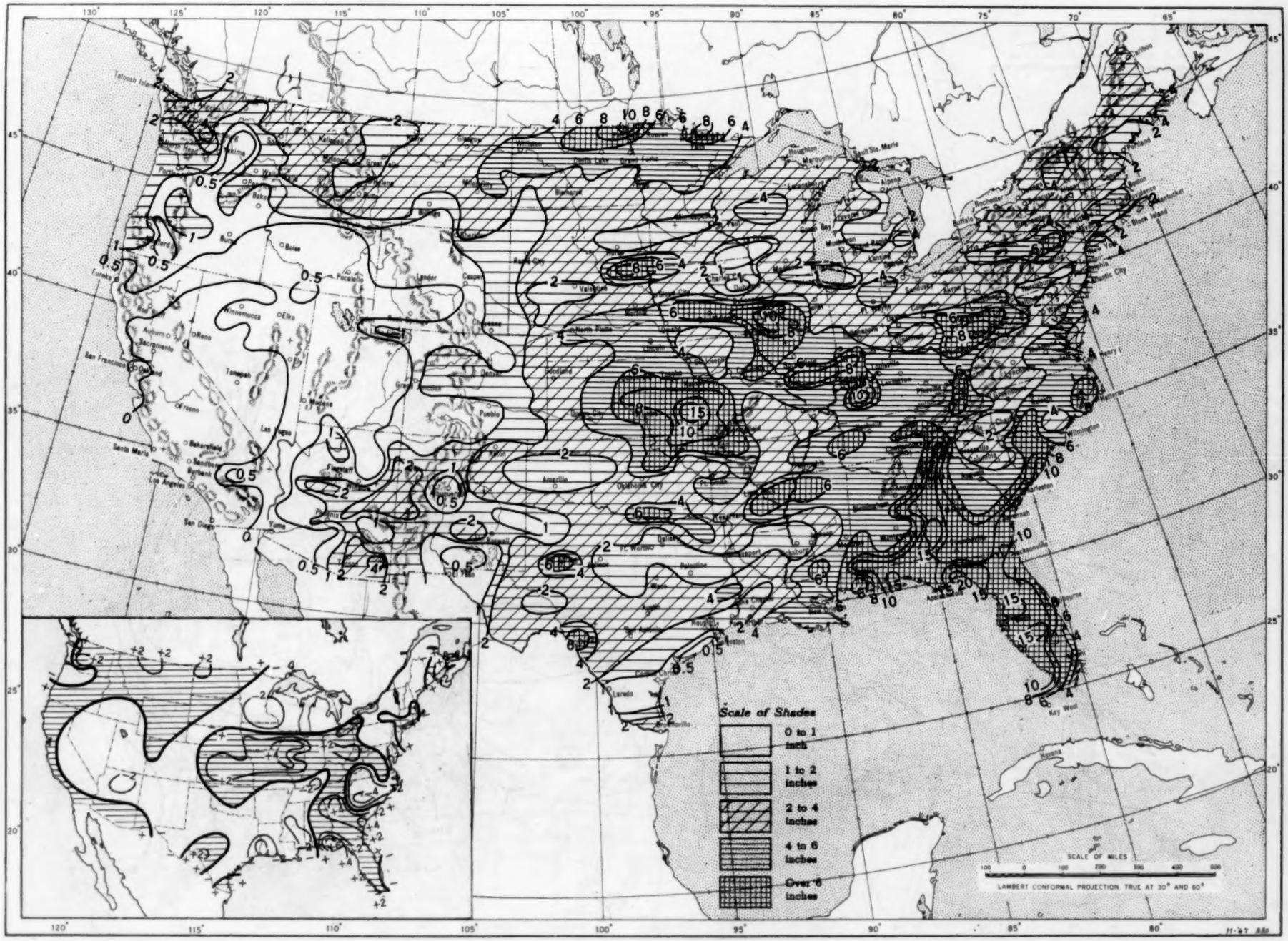

Scale of Shades
0 to 1 inch
1 to 2 inches
2 to 4 inches
4 to 6 inches
Over 6 inches
SCALE OF MILES
LAMBERT CONFORMAL PROJECTION, TRUE AT 30° AND 60°

Chart VI. Isobars (mb.) at Sea Level and Isotherms (°F.) at Surface; Prevailing Winds, July 1948

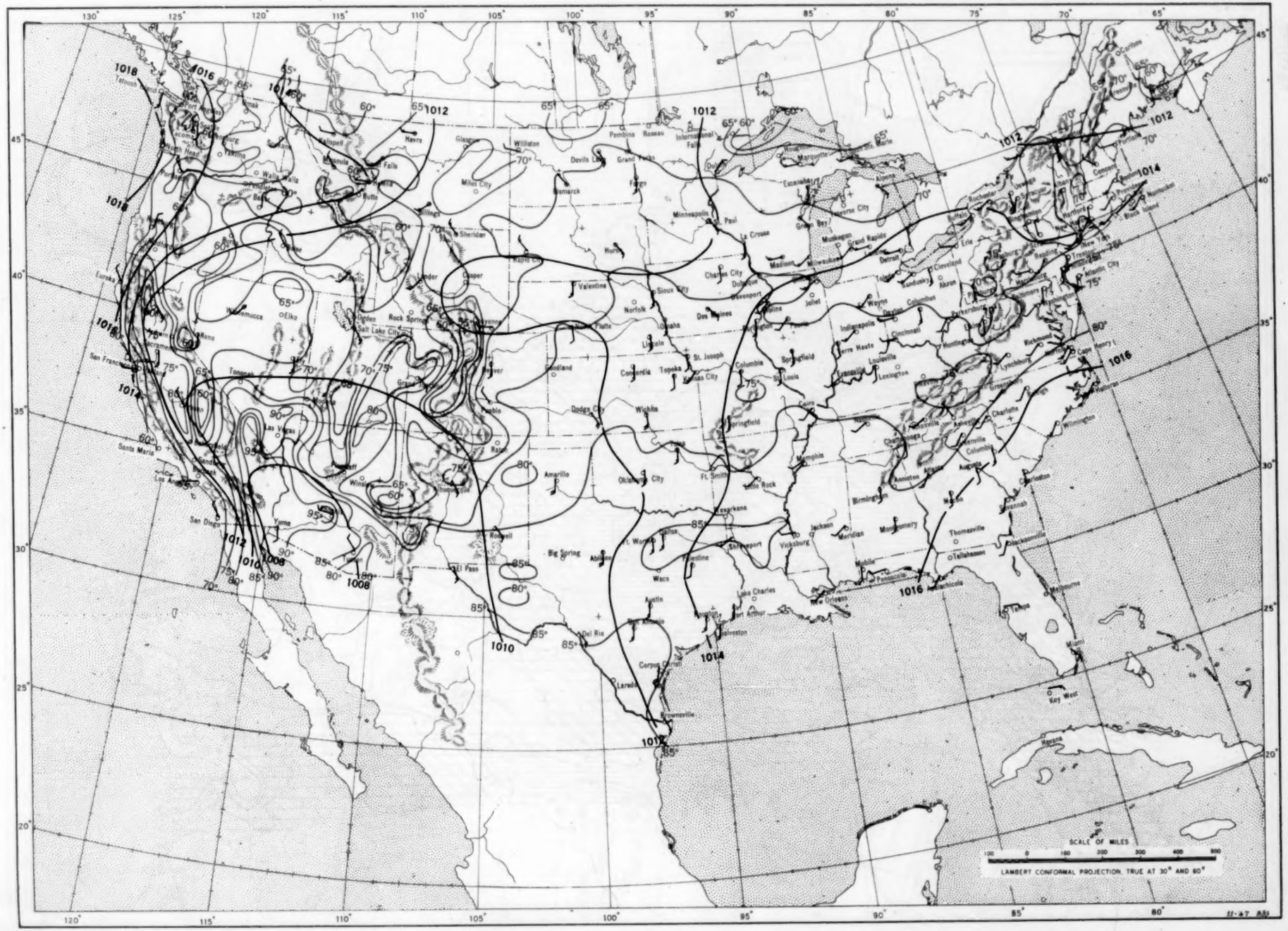
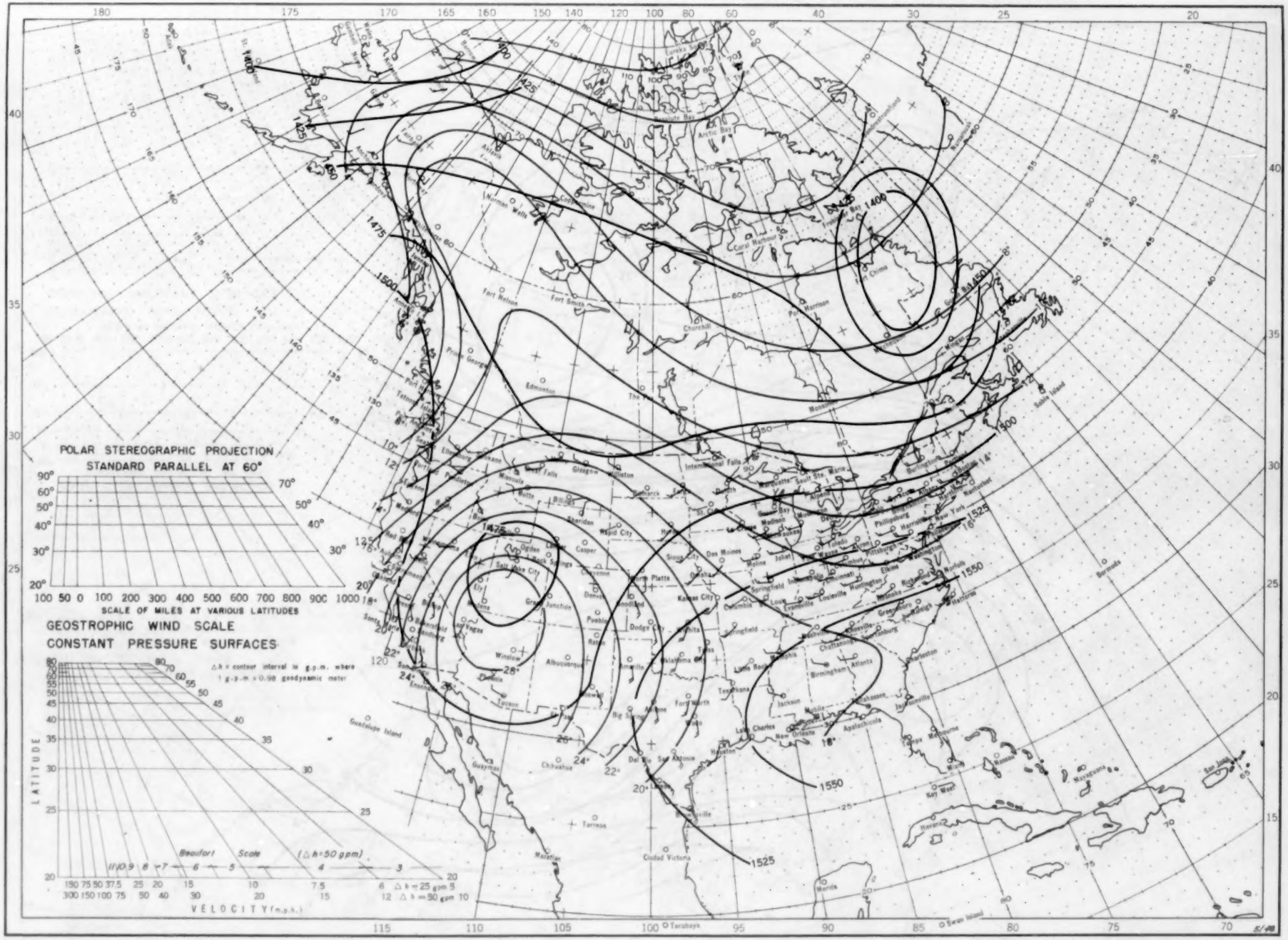
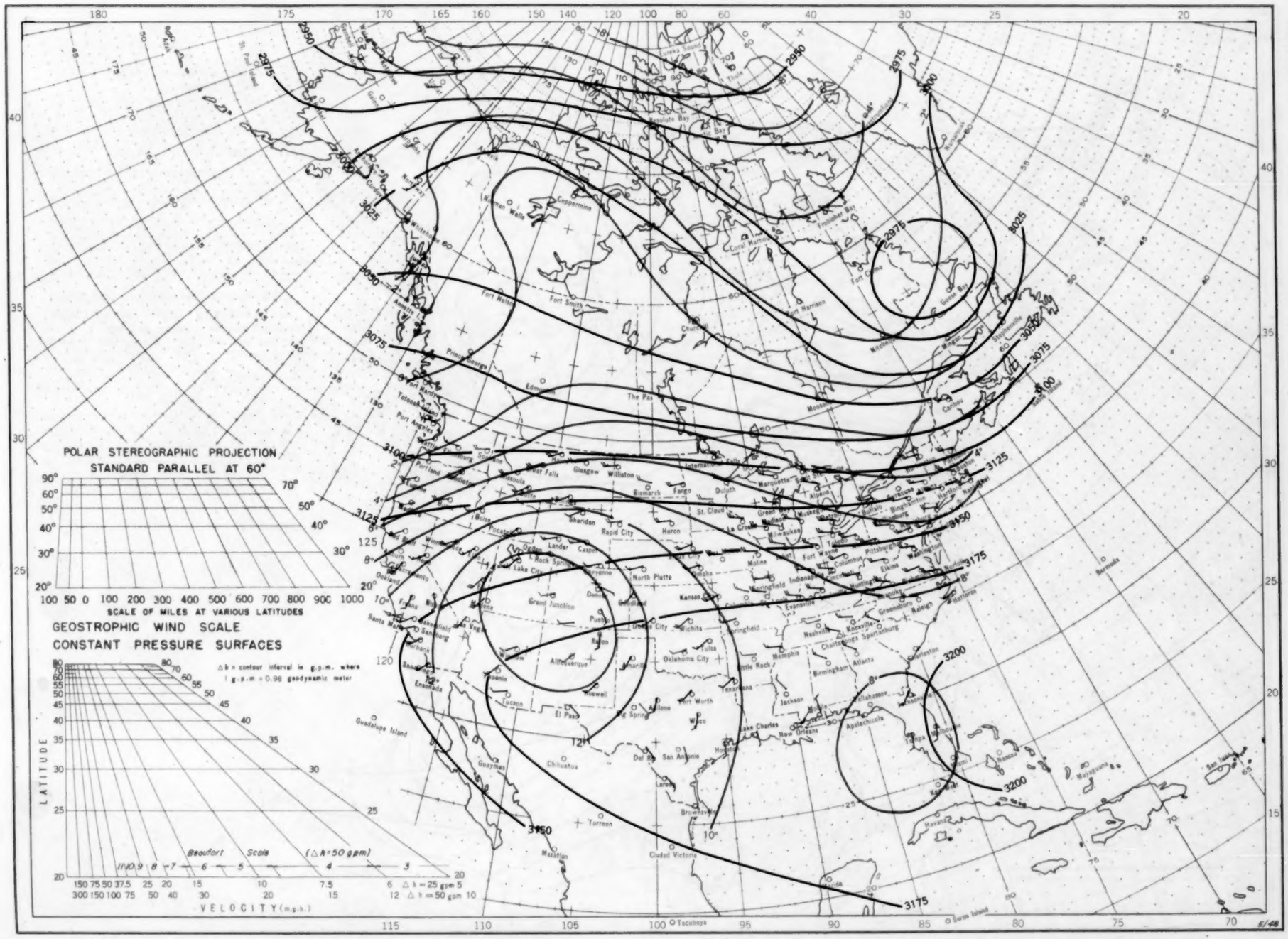


Chart VIII, July 1948. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 850-millibar Pressure Surface, and Resultant Winds at 1,500 Meters (m. s. l.)



Contour lines and isotherms based on radiosonde observations at 0300 G. C. T. Winds indicated by black arrows based on pilot balloon observations at 2200 G. C. T.; those indicated by red arrows based on rawins taken at 0300 G. C. T.

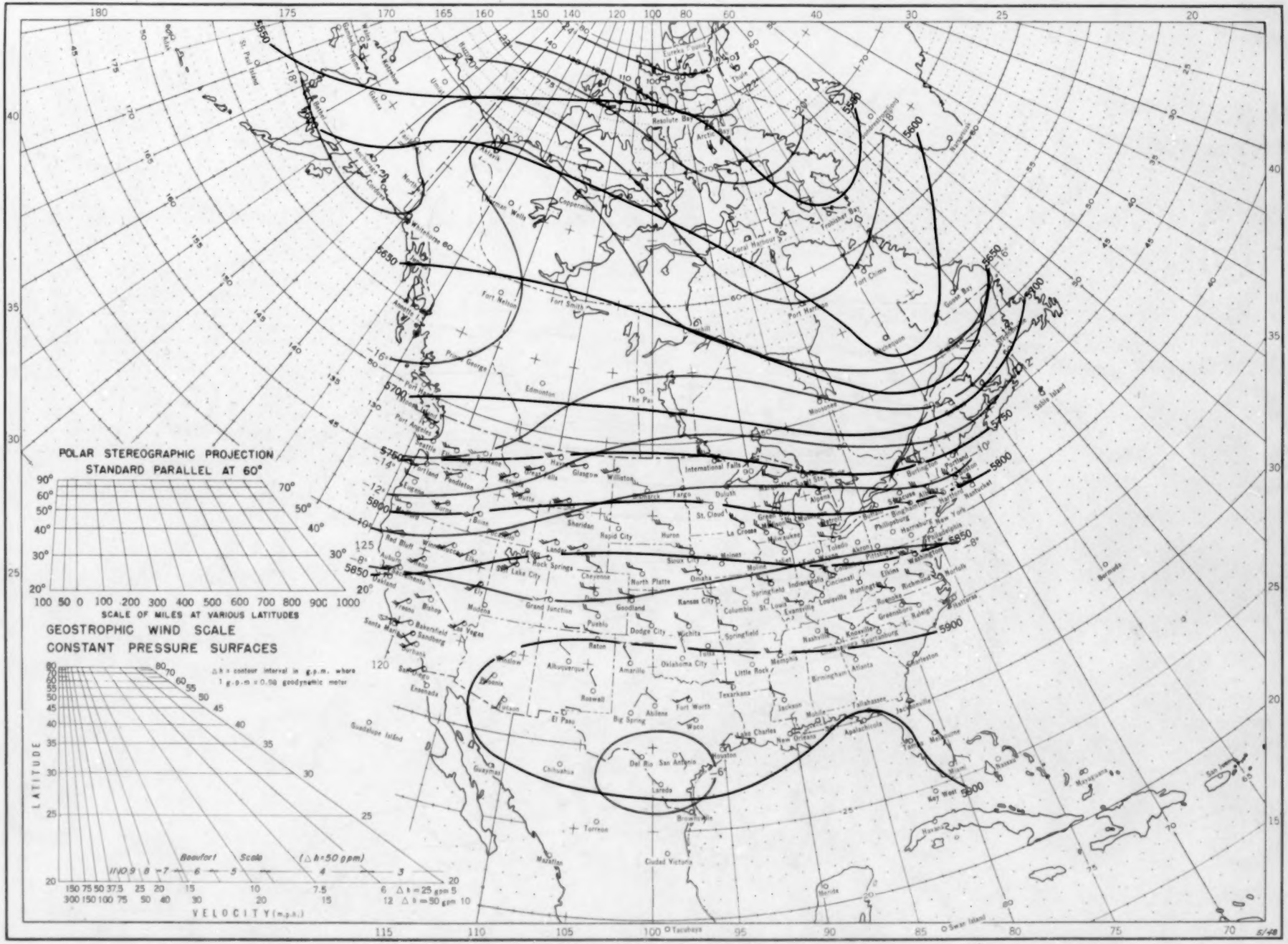
Chart IX, July 1948. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 700-millibar Pressure Surface, and Resultant Winds at 3,000 Meters (m. s. l.)



Contour lines and isotherms based on radiosonde observations at 0300 G. C. T. Winds indicated by black arrows based on pilot balloon observations at 2200 G. C. T.; those indicated by red arrows based on rawins taken at 0300 G. C. T.

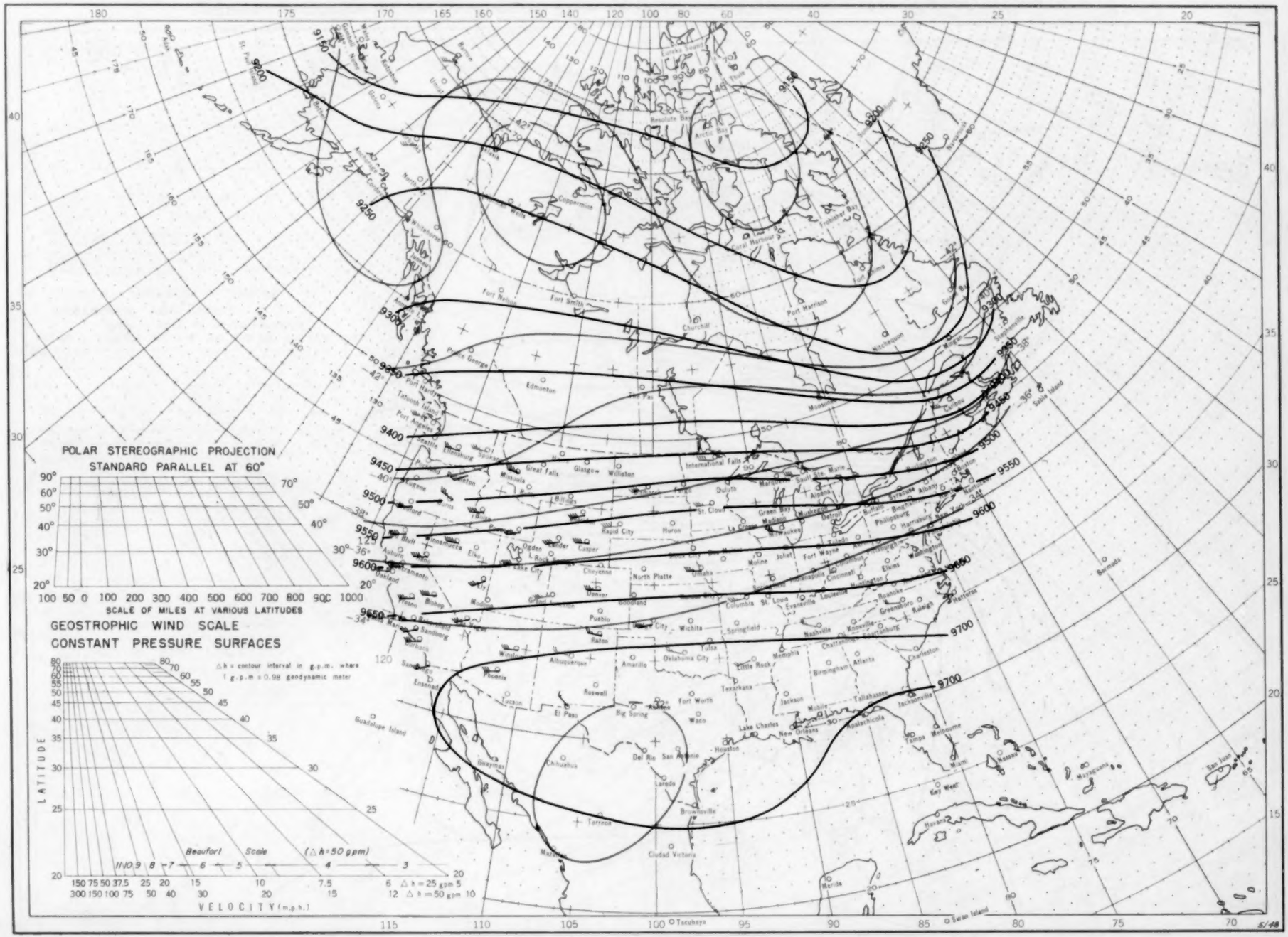
Contour lines and isotherms based on radiosonde observations at 0300 G. C. T. Winds indicated by black arrows based on pilot balloon observations at 2200 G. C. T.; those indicated by red arrows based on rawins taken at 0300 G. C. T.

Chart X, July 1948. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 500-millibar Pressure Surface, and Resultant Winds at 5,000 Meters (m. s. l.)



Contour lines and isotherms based on radiosonde observations at 0300 G. C. T. Winds indicated by black arrows based on pilot balloon observations at 2200 G. C. T.; those indicated by red arrows based on rawins taken at 0300 G. C. T.

Chart XI, July 1948. Contour Lines of Dynamic Height (Geopotential) in Units of 0.98 Dynamic Meters and Isotherms in Degrees Centigrade for the 300-millibar Pressure Surface, and Resultant Winds at 10,000 Meters (m. s. l.)



Contour lines and isotherms based on radiosonde observations at 0300 G. C. T. Winds indicated by black arrows based on pilot balloon observations at 2200 G. C. T.; those indicated by red arrows based on rawins taken at 0300 G. C. T.